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& Medical
Sciences



THE AGRICULTURAL GAZETTE OF CANADA

Vol. VIII

January-February, 1921

No. 1

LEADING TOPICS

The Organization of Departments of Agriculture

Forest Survey from the Air

The Protection of Birds

Report of Seed Purchasing Commission

Household Science in Saskatchewan

The Women's Institute Better Rural School Movement

STORAGE

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA

The Agricultural Gazette is the official organ of the Department of Agriculture of Canada.

The chief function of The Gazette is to promote and give publicity to the work performed in the interest of Agriculture and Agricultural Education by Departments of Agriculture, both Dominion and Provincial.

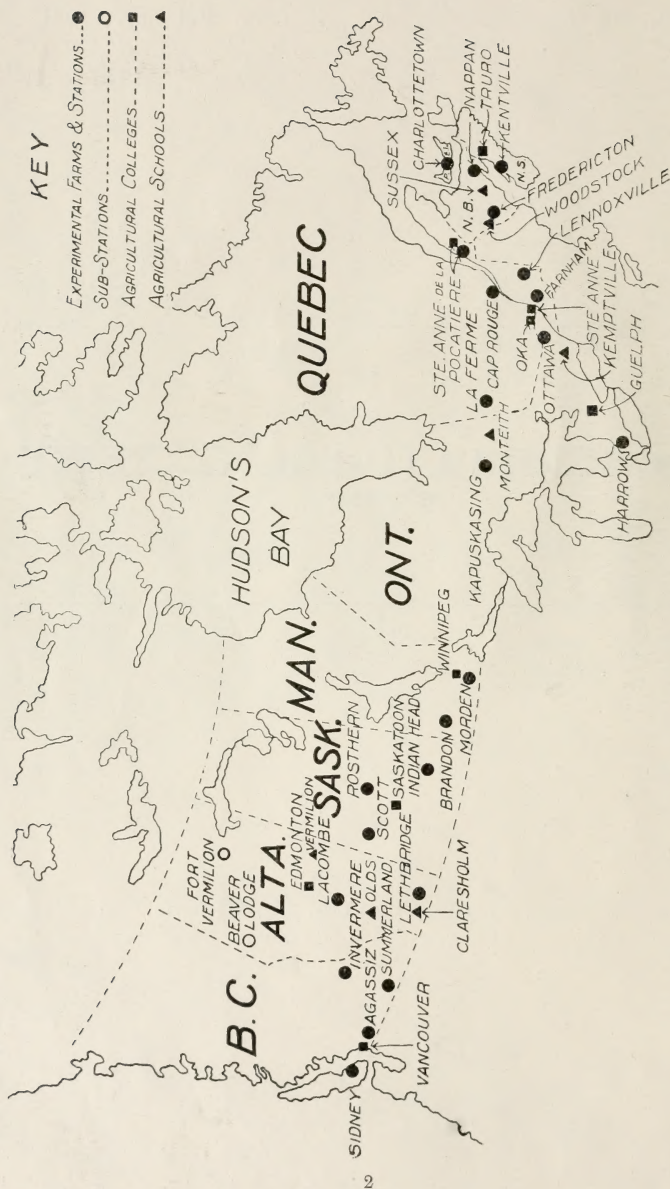
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The AGRICULTURAL GAZETTE
OF CANADA

Issued by the Dominion Department
of Agriculture, Ottawa



MAP OF CANADA SHOWING THE LOCATIONS OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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The AGRICULTURAL GAZETTE

OF CANADA

VOL. VIII

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No. 1

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Subscriptions should be forwarded to the Editor, Agricultural Gazette, Ottawa.

J. B. SPENCER, B.S.A., Director of Publicity.

ANNOUNCEMENT

WITH the current issue, *The Agricultural Gazette* enters upon the eighth year of its career as the organ of the Dominion Department of Agriculture and as the medium for keeping officials throughout Canada informed as to agricultural progress and development.

The decision has been reached to issue the *Gazette* as a bi-monthly instead of a monthly publication, as heretofore. It is believed that this change can be made without detriment to the usefulness of the journal. The *Gazette* will continue to be the exponent of the policies and activities of departments of government charged with the regulation of agricultural affairs and with the advancement of agricultural training and education. It will continue to function as the medium for giving publicity to departmental effort, so as to assist workers by keeping them informed as to methods and results, thereby aiding them to systematize and simplify their work and to avoid duplication.

The *Gazette* solicits a continuation of that co-operation and assistance of workers in agriculture and agricultural education which hitherto has been so liberally accorded.

GOVERNMENTAL ASSISTANCE TO THE AGRICULTURAL INDUSTRY

THE FARM is Canada's most important national asset. As the basic industry, underlying the material prosperity of the country, its well-being and advancement are matters of national concern. The expenditure for the promotion of agriculture benefits, not merely those directly engaged in farming, but every other section of the community. Governments are therefore justified in

making liberal provision for financing the undertakings of departments charged with its direction and supervision.

The total appropriation placed at the disposal of the federal and provincial Departments of Agriculture for the fiscal year 1920-21, approximates the sum of ten million dollars, as denoted by the following table:—

Department of Agriculture of Canada.....	\$ 5,020,000
"The Agricultural Instruction Act"—Federal.....	1,100,000
Prince Edward Island, 1919-20..	20,170
Nova Scotia.....	111,450
New Brunswick.....	118,181
Quebec.....	899,500
Ontario.....	1,594,540
Manitoba.....	582,490
Saskatchewan.....	282,014
Alberta.....	538,100
British Columbia.....	375,736
	<hr/> \$ 10,642,181

In this number of *The Agricultural Gazette* will be found in concise form an outline of the organization of the several departments of agriculture, federal and provincial, and a summary of the various activities carried on with a view to the advancement of the farming industry.

The Dominion Department of Agriculture was created in 1868. As originally constituted, it had but little to do with agriculture, and it was not until 1887, when the Experimental Farms system was instituted, that it began the work for which it was established.

The functions of the federal department are largely those of regulation, protection, promotion, and experiment

and investigation. No clear demarcation exists as to the spheres of action of Dominion and provincial departments, except as regards the control of educational affairs, which is definitely assigned to the provinces. Such institutions as colleges of agriculture and special agricultural schools have grown up under provincial jurisdiction. The provinces, guided by this principle, have likewise developed the machinery necessary for the carrying on of extension work in its broader aspects. This includes the conveying to the man on the farm by various means the facts essential to the successful prosecution of his calling. It was one of the principal objects of the Agricultural Instruction Act to assist provinces in conducting this form of work.

Extension work does not, however, belong exclusively to the provinces. It is obviously associated with all forms of propaganda for the stimulation of any branch of the industry, particularly in regard to its commercial aspects. Work in the extension field forms an important phase of federal activities, carried on, however, in close co-operation with the provinces. Thus the regulation of the marketing of farm products, and instruction in the preparation of those products, go hand in hand. In the field of experiment, investigation and research the Dominion department is primarily responsible, and it is the recognition of this fact that led to the extension in recent years of the Experimental Farms system to all parts of Canada.

PART I

Dominion Department of Agriculture

ORGANIZATION AND SCOPE OF THE DOMINION DEPARTMENT OF AGRICULTURE

THE following is a statement in summarized form of the organization of the Department of Agriculture for Canada and of the work performed by the department.

The Department of Agriculture is divided into a number of branches, each of which takes charge of certain activities or administers certain legislation pertaining to one particular line of agricultural industry. The branches of the department are as follows:—

Administrative Branch,
Experimental Farms Branch,
Health of Animals Branch,
Live Stock Branch,
Dairy and Cold Storage Branch,
Seed Branch,
Entomological Branch,
Fruit Branch,
International Institute of Agriculture,
Publications Branch,
Agricultural Instruction Act Branch.

The various lines of effort of each branch are given in a very brief manner below.

ADMINISTRATIVE BRANCH

The Administrative Branch, as its name implies, has to do with the administration of the whole Department of Agriculture. The major divisions are—the Minister's office, the Deputy Minister's office, the Accountant's office, where all financial matters in connection with the department are attended to, and the office of the Translator. The translator's office is responsible for the translation into French of all departmental publications, which are usually written in the

English language, and also for the writing of French correspondence for the Administrative Branch when necessary.

EXPERIMENTAL FARMS BRANCH

This branch is the largest of all the branches of the Federal Department of Agriculture, and is the one which probably comes more closely in touch with the farmers of the country than do any of the others. The Experimental Farms system covers a wide field, and gives its service to a wide territory, as the branch Experimental Farms are scattered all over the country, from the Atlantic to the Pacific and from the international boundary line to the Yukon. The centre of the Experimental Farms system is the Central Experimental Farm at Ottawa, and there are 20 branch experimental farms and stations at present in operation, located at the following points:—

Charlottetown, P.E.I.,
Kentville, N.S.,
Nappan, N.S.,
Fredericton, N.B.,
Ste. Anne de la Pocatière, Que.,
Cap Rouge, Que.,
Lennoxville, Que.,
LaFerne, Que.,
Kapusking, Ont.,
Morden, Man.,
Brandon, Man.,
Indian Head, Sask.,
Rosthern, Sask.,
Scott, Sask.,
Lethbridge, Alta.,
Lacombe, Alta.,
Summerland, B.C.,
Agassiz, B.C.,
Invermere, B.C.,
Sidney, B.C.

Besides the Experimental Farms proper, a number of Experimental Sub-stations are located in the thinly settled districts of northern Alberta and the Northwest Territories where experimental work on a smaller scale is carried on. These Sub-stations are located at Beaverlodge, Alta., Fort Vermilion, Alta., Swede Creek, Y.T., Dawson, Y.T., Salmon Arm, B.C., while experimental work is also carried on for the Experimental Farms Branch at some of the settlements in the Northwest Territories, namely, Fort Smith, Fort Resolution and Fort Providence.

Connected with the Experimental Farms system are two Tobacco Stations, at Farnham, Que., and Harrow, Ont. These Stations are located in a country which has proved itself suitable for tobacco production, and their chief line of operation is in connection with tobacco production.

In order to bring the work of the Experimental Farms more closely to the attention of farmers in some of the newer provinces, as well as the older ones, a system of Illustration Stations has now been established. Some 80 of these stations have been established in the provinces of Alberta, Saskatchewan, Quebec, New Brunswick, and Nova Scotia, and their influence has already been felt in the country surrounding them.

As stated above, the work of the Experimental Farms system is directed from Ottawa, where the work is divided into the following sub-divisions, each under the charge of a Chief.—

Horticulture,
Cereals,
Animal Husbandry,
Field Husbandry,
Chemistry,
Poultry,
Forage Plants,
Botany,
Bees,
Tobacco,
Illustration Stations,
Fibre,
Extension and Publicity.

As is indicated by its name, the Experimental Farms Branch is mainly occupied in conducting experimental and research work in connection with agriculture along the various lines indicated by the names of the divisions mentioned in the preceding paragraph. These lines cover practically all the field of practical agriculture, and while each farm perhaps does not carry on work in all these lines, an attempt is made to make each Experimental Farm of maximum benefit to the district which it serves.

The results obtained from experimental work carried on on the Farms are given to the public through the media of press articles, publications, lectures and addresses, exhibits at agricultural fairs, as well as by direct illustration and demonstration on the Experimental Farms themselves, and on the Illustration Stations, which endeavour to illustrate the methods that have been found to be most suitable on the Experimental Farms proper.

In addition to the experimental work, this branch also has charge of the administration of that section of the Destructive Insect and Pest Act which deals with plant diseases. For the past few years potato inspection has been carried on, and a great deal of investigation into black-rust of wheat and white pine blister rust. Plant pathological laboratories have been established at Charlottetown, P.E.I., Fredericton, N.B., St. Catharines, Ont., Winnipeg, Man., Brandon, Man., Indian Head, Sask., and Saskatoon, Sask., as well as the central laboratory at Ottawa, and these laboratories serve as centres for the work of the administration of this Act, as well as for research work into plant diseases.

HEALTH OF ANIMALS BRANCH

The activities of this branch take, in general, the direction of maintaining the health of the live stock population of this country at the highest possible standard, of safe-guarding the consumers by insuring a supply of wholesome

and properly inspected meat, meat products and canned goods, and of research work in animal diseases.

The Health of Animals Branch is divided into three divisions, viz.:—

Animal Contagious Diseases Division, which administers the **Animal Contagious Diseases Act**;

Meat and Canned Foods Division, which administers the **Meat and Canned Foods Act**;

Pathological Division, which conducts research work into diseases of live stock.

A large staff of veterinary inspectors is maintained by the Animal Contagious Diseases Division at ports of entry, as well as other inland points in this country. Their duties consist of the inspection of animals entering Canada, and placing such animals in quarantine if found necessary. There are 85 quarantine stations located at various ports. These inspectors also investigate and enforce control measures for outbreaks of contagious diseases of live stock as they occur. A great deal of work has been done during the past few years towards the suppression of Hog Cholera, and under the present regulations garbage feeders are licensed and their premises periodically inspected, and quarantined if any trace of disease is found. The Animal Contagious Diseases Act also provides for the superintending of the disinfecting and cleaning of stockyards and railway cars used in the transportation of live stock. Regulations have also been put into operation whereby municipalities may obtain inspection for dairy cattle producing milk for sale in that municipality, and last year a commencement was made towards putting into operation the Accredited Herd System which has proven so successful in the United States. Under this system, owners of pure-bred herds can obtain inspection for tuberculosis, and when their herds have been proved to be free from that disease they are placed on the Accredited List and enjoy certain privileges as to

export to the United States without further inspection.

The Meat and Canned Foods Division also maintains a large staff of veterinary inspectors and lay inspectors, whose duty it is to examine animals before they are slaughtered in the abattoirs, and also examine the meat and meat products from these animals before they can be offered for sale for human consumption. These veterinary inspectors are stationed at all the large packing plants throughout the country, and this division also inspects all meat and meat products coming into inspected plants from foreign countries. Another phase of its work is the supervision and inspection of canning factories, jam factories, evaporated milk factories and condensed milk plants doing business in Canada; the testing and reporting on samples of imported and domestic canned fruits and vegetables as well as milk, while just recently new regulations provide for the approval of this Division being obtained as to labels used on canned fruits, vegetables and milk manufactured and offered for sale in this country.

The Pathological Division maintains a Biological Laboratory at Ottawa, a Research Station at Hull, Que., and field laboratories at Agassiz, B.C., and Lethbridge, Alta. At these laboratories supplies of mallein, tuberculin and blackleg vaccine are prepared and tested and these are sold to applicants at cost. A great deal of research work has already been carried on, and is continually being carried on with various live stock diseases such as dourine, contagious abortion, chicken diseases, bracken poisoning, while one officer of this division is stationed at Charlottetown, P.E.I., where he is conducting an investigation in connection with the nutrition of black foxes.

LIVE STOCK BRANCH

The activities of this branch are in general directed towards the improvement and development of the live stock

industry by the encouragement of the production of better live stock, and by improving marketing facilities. This work, while carried on under direction from Ottawa, is performed mainly in the producing and marketing districts where officers are stationed to help the producer and the shipper.

This branch also administers the Live Stock and Live Stock Products Act.

The chief divisions of this branch are:—

**Horse Division,
Cattle Division,
Sheep and Goat Division,
Markets Division,
Poultry Division.**

The Horse Division administers the policy with reference to Federal aid to horse-breeding associations. Up to a few years ago the department owned a number of pure-bred stallions which were loaned for breeding purposes to farmers' organizations throughout the country. This policy has in the past few years been considerably modified, and the department's holdings of stallions materially decreased. Under the present policy the department pays a grant to farmers' associations using a stallion that has been approved by the inspectors of the Horse Division. This division also makes arrangements for providing live stock judges for agricultural fairs which have received the Government grant, and investigates and gives advice upon transportation matters as affecting live stock.

The Cattle Division administers the policy with respect to the breeding of better beef and dairy cattle. Pure-bred bulls are loaned to farmers' organizations and dairy cows are tested for record of performance.

This division also has charge of the administration of the Free Freight and Car Lot Policies which give assistance to farmers and others in taking back from marketing centres animals brought there for slaughter but which are found

by our officers to be suitable for breeding or finishing purposes.

The Sheep and Goat Division loans pure-bred rams and boars to farmers' associations under the Distribution Policy, and also supervises the grading of wool and the encouragement of its co-operative marketing by farmers' organizations. A financial grant is made by this division to farmers using pure-bred rams for the first time, while attention is also given to the organization of ram clubs and sheep-breeding centres. A report is sent out each week dealing with the wool market, and exhibition material in connection with the sheep, goat and swine industries is prepared and shown during the season.

The Poultry Division administers the Live Stock and Live Products Act as it refers to eggs, and provides for the inspection of eggs offered for export. This division also encourages the co-operative marketing of eggs and poultry, publishes a daily and weekly egg and poultry market report, and gives advice on the transportation, packing and marketing of eggs and poultry. A record of performance for poultry has recently been inaugurated, and inspectors have been appointed to carry on the necessary work in connection therewith.

The Markets Division administers the Live Stock and Live Stock Products Act as it refers to stockyards and live stock exchanges. The part of this division located in Ottawa had largely to do with the preparation and publishing of daily, weekly and monthly market reports dealing with the marketing of live stock. Stockyard agents are stationed in the stockyards at Edmonton, Calgary, Prince Albert, Winnipeg, Toronto and Montreal to obtain marketing information, and assist farmers and live stock shippers. These officers also assist the Cattle Division in the operation of the Free Freight and Car Lot Policies.

Under the Live Stock and Live Stock Products Act the department passes upon the by-laws, constitutions, etc., of

live stock exchanges operating in stock-yards under their supervision.

DAIRY AND COLD STORAGE BRANCH

The Dairy and Cold Storage Branch, as its name implies, has to do with the dairy industry of this country, and also in a small measure with cold storage warehouses. It administers the Dairy Industry Act, the Oleomargarine Act, and the Cold Storage Act.

The chief divisions are the Dairy and Cold Storage Division and the Markets Division.

The Dairy and Cold Storage Division operates a Dairy Station at Finch, Ont., and a Pre-cooling Cold Storage Warehouse at Grimsby, Ont. Experiments and investigations into the manufacture of butter and cheese are carried on, and during the past year a Dominion Educational Butter Scoring Contest has been in operation, involving the inspection and rating of samples of butter from all over the country. In order to encourage the farmer to keep only the best producing cows, officers of this division organize and carry on cow-testing work in the various provinces, while last year a commencement was made in the grading of butter offered for export at the port of Montreal. Under the Cold Storage Warehouse Act, the department pays a certain subsidy towards the erection of cold storage warehouses used for public cold storage, and the work in connection with the payment of these subsidies is under the control of this division. Investigations are carried on in connection with the shipment of fruits, dairy products, eggs, etc., in refrigerator cars.

The Markets Division arranges for refrigerator car service for butter and cheese shipments operated by railways under agreement with the department. Its cargo inspectors also inspect and supervise the loading at Canadian and the unloading at British ports of all shipments of perishable products. Thermographs are placed in all vessels

carrying such products and the records so obtained are blue-printed and distributed to shippers.

A weekly dairy produce market report and monthly news letter are published by this division, which also inspects butter under the Dairy Industry Act, and administers the Oleomargarine Act.

SEED BRANCH

The Seed Branch works along the lines of the encouragement of the use of better and purer seed, and the production of good seed. During the war years it also had charge of the work of insuring a proper supply of good seed for districts in Canada where there was an apparent shortage. This branch also administers the Seed Control Act, and at the last session of Parliament the administration of the Commercial Feeding Stuffs Act was also placed under the charge of this branch.

There are four divisions in the Seed Branch, namely:—

Seed Testing Division,
Seed Inspection Division,
Seed Markets Division,
Seed Purchasing Commission.

The Seed Testing Division maintains and operates Government Seed Laboratories at Ottawa, Winnipeg, and Calgary, where purity analyses and germination tests of seed samples for farmers, seed merchants, and institutions are carried on. Official samples taken by customs officers from seed importations, by seed inspectors under the Seed Control Act, and for special investigations are also tested at these laboratories. A great deal of investigational and research work with seeds has been carried out during the past few years, and some valuable work connected with the micro-analytical tests of feeding-stuffs has also been brought to a favourable conclusion.

The Seed Inspection Division enforces the Seed Control Act. The inspectors connected with this division

inspect seed grain and fibre flaxseed received into, and shipped from Government elevators or other warehouses by the Seed Purchasing Commission, or other dealers. Certain importation regulations are applied, and general quality standards for the various grades of clover and grass seeds have also been fixed. Samples submitted to the seed laboratories for test are graded and reported on by this division.

The Seed Markets Division compiles and issues semi-monthly seed market reports, prepares and distributes lists of reliable seed importers in other parts of the Empire and foreign countries. It also supervises the administration of the subventions paid by the Seed Branch to the various provinces in connection with seed fairs and field crop competitions. During the war years this division, in collaboration with the Division of Forage Plants of the Experimental Farms Branch, also arranged for the production of a large quantity of field root seed of which at that time it was anticipated there would be a serious shortage. Advertising and other means are resorted to in order to bring about the extension of markets for Canadian seed.

The Seed Purchasing Commission has now been in operation for some four years. It was originally established as a war measure in order to insure a supply of good seed for farmers in certain areas which had been devastated by drought or other causes, and has been in operation since that time. This Commission purchases, stores, cleans, and distributes at cost inspected seed of good quality to those districts where there is a seed shortage. It has already done a business of over three million dollars per year.

The outside work of the Seed Branch is carried on by a field staff of inspectors. For the purposes of administration the Dominion is divided into six districts, each of which has a district seed inspector in charge. The officers

in these districts are occupied with seed inspection, inspecting field crops, obtaining market information, judging seed, and addressing meetings.

It is anticipated that the new Commercial Feeding Stuffs Act will be put into operation early in the coming year, and this will of course necessitate a large increase in the activities of the Seed Branch.

ENTOMOLOGICAL BRANCH

The Entomological Branch occupies itself with studies of means of control for injurious insects affecting all agricultural products. It also administers that part of the Destructive Insect and Pest Act which has reference to insect diseases. For purposes of administration the branch is divided into four divisions:—

The Division of Field Crop and Garden Insects conducts life-history studies and studies methods of control of insects injurious to field and garden crops. Outbreaks of injurious insects are investigated, and control measures organized. Specimens are identified, and some work is also carried on with investigations in reference to insects in green-houses.

The Division of Forest Insects investigates outbreaks and organizes methods of control for insects affecting trees. Forest sample plot areas have been established in various districts so that the study of these insects may be facilitated.

The Division of Foreign Pests Suppression enforces the Destructive Insect and Pest Act as it refers to insects. For this purpose fumigation stations are established at a number of points and all nursery stock imported is inspected and fumigated at these stations. Whenever necessary, quarantines and embargoes are laid against foreign and native insect pests, and enforced by this division. The division also conducts scouting work in connection with outbreaks of injurious insects.

The Division of Systematic Entomology has charge of the National Collection of Insects. This division does most of the identification work of the branch, and is also occupied in mounting and preparing material for addition to the National Collection.

The Entomological Branch also conducts investigations into insects affecting fruit, insecticides; the colonization, liberation and recovery of parasites of various insects, as well as orchard spraying and potato spraying experiments.

The field work of this branch is conducted from ten entomological field laboratories, stationed in various parts of the country. Each of these is in charge of a competent entomologist, and from these field laboratories local insect conditions are studied.

FRUIT BRANCH

The Fruit Branch administers the Inspection and Sales Act as it affects fruit, fruit packages and potatoes. Its work also consists of the general encouragement of the fruit industry, especially the marketing of fruit. Fruit and vegetable crop reports are published at periodical intervals, and the officers of the branch assist producers and dealers in buying and selling their fruit. The fruit inspectors also address meetings of fruit growers, and give demonstrations of the proper methods of picking, grading and packing fruit. Special transportation officers are employed to give assistance and advice to shippers as to the proper routing, etc., of fruit shipments. Complaints of improper shipments of fruit are investigated, and improved methods of distribution studied. Matters connected with fruit transportation generally are discussed with railway, express and steamship officials with a view to devising means for improved methods in this regard.

PUBLICATIONS BRANCH

The distribution of the numerous publications issued from time to time by the Department of Agriculture is carried on by the Publications Branch. Most of the branches publish from time to time bulletins, pamphlets, circulars, etc., and the Publications Branch maintains mailing lists and sees that all persons on these mailing lists receive the publications which they desire. This branch also has charge of the publication of the official departmental magazine, *The Agricultural Gazette*, and of other publicity material.

INTERNATIONAL INSTITUTE BRANCH

The International Institute of Agriculture serves as the connecting link between the Canadian Department of Agriculture and the International Institute of Agriculture at Rome.

This branch obtains and publishes through the press, and through *The Agricultural Gazette* information on matters pertaining to world agriculture which it receives through the central offices of the Institute.

It also provides the Institute with information with reference to Canadian agriculture, and the Institute Commissioner represents the Canadian Department on the International Institute.

The departmental library is also under the control of this branch.

AGRICULTURAL INSTRUCTION ACT BRANCH

Under the Agricultural Instruction Act the sum of \$1,100,000 annually for a period of twenty years was appropriated to assist the provinces in agricultural instruction work.

This branch administers this Act, and makes the necessary grants to the various provinces for the purpose of providing agricultural instruction and demonstration, and agricultural education in colleges, agricultural schools, high schools and elementary schools.

SOME ACTIVITIES OF THE YEAR 1920

BY J. A. RUDDICK, COMMISSIONER, DAIRY AND COLD STORAGE

DURING the war some of the activities of this branch became more or less inoperative on account of the prevailing confusion. For instance, it was impossible to carry out the cargo inspection service properly, both at Canadian ports and in the United Kingdom, on account of the irregularity of sailings, the disorganization of the regular steamship lines, and the secrecy which covered the movements of all vessels. With a return to more normal conditions the cargo inspection service was re-organized for 1920 and has been functioning as usual throughout the season. Thorough inspection has been made at Canadian ports of perishable food products loaded for overseas shipment, and similar reports were received regularly from the inspectors in the United Kingdom. Recording thermometers were placed with practically all shipments in connection with which the question of temperature was important. Irregularities in the handling of produce, defects in packing, etc., are reported direct to shippers.

Finch Dairy Station

The commercial operations of the Finch Dairy Station have been very successful during the past season. Some butter and cheese were manufactured, but generally speaking a better return could be obtained for milk or cream disposed of through the milk distributors in Montreal or Ottawa and the condensed milk factory at Chesterville. By offering the product for which the best relative price could be obtained at the time, the salesman has been able to secure returns to the patrons considerably in excess of those which were secured at factories where the output was confined to one product only. The

net return per 100 pounds of milk supplied throughout the year from January to October was as follows:—

January.. . . .	\$3.50
February.. . . .	3.22
March.. . . .	2.70
April.. . . .	2.37
May.. . . .	2.49
June.. . . .	2.38
July.. . . .	2.24
August.. . . .	2.28
September.. . . .	2.45
October.. . . .	2.63

The returns for November and December are not yet available.

The Finch Dairy Station is operated as a model factory and as a commercial demonstration of the advantage of having factories equipped for the manufacture of either butter or cheese or for the sale of milk or cream at short notice. The operation of the station serves to keep the experts of the Dairy Branch in close touch with the problems of milk production and dairy manufactures, and provides facilities for conducting experiments and for trying out new apparatus or new processes in the manufacture of butter or cheese. Being operated the year round, it serves to encourage the production of winter milk. During the winter of 1912-13 (December to March, inclusive) the total quantity of milk received was 208,937 pounds. During the same period in 1919-20 the total quantity delivered was 862,163 pounds. In the month of December, 1919, there was nearly four and a half times as much milk delivered as in December, 1912.

The yearly supply of milk has increased from 2,069,281 pounds in 1912 to 5,480,816 pounds in 1919, and there will be a further increase in 1920. The prevailing rates are charged for the manufacture of butter or cheese and for the

handling of milk and cream, and the revenue from this source exceeds the total annual expenditure by several thousand dollars. A review of the work of the Finch Dairy Station for the years 1912 to 1919 is given in bulletin No. 55 of the Dairy and Cold Storage Series.

The Grading of Dairy Produce

A new line of work was undertaken in 1920 in the grading of export cheese, which is sold by auction at Montreal. Several of the provinces have been doing more or less grading of cheese and butter for educational purposes and for domestic trade during several years past, and the staff of this branch has endeavoured to promote uniformity in the grading under different provincial authorities by holding conferences of graders and in other ways co-ordinating the work so as to secure uniformity in methods and results. The standards and definitions adopted at the last Dominion Dairy Conference are now universally followed, and it is gratifying to be able to state that there is a remarkable uniformity in the work which is being done throughout the Dominion in this respect. It seems quite probable that there will be considerable extension of the system of grading in the near future. It will facilitate trading, establish confidence in our products abroad, and it is the best means to secure just rewards to the factory or maker that turns out a superior article. The policy of this branch, approved by the minister, is that when producers and traders are ready for a complete system for the grading of dairy produce for export the branch will be prepared to undertake it.

Dominion Educational Butter Scoring Contest

The Dominion Educational Butter Scoring Contest, inaugurated in 1919, was repeated in 1920. Samples of butter

were received from all the provinces monthly from May to October. These samples were scored regularly at Montreal and reports sent to all the creameries in Canada. It is hoped to continue this work in a somewhat modified and extended form in 1921.

Cow Testing

The cow testing work, which has been carried on by this branch for a number of years, was extended considerably during the year under the senior dairy promoter, a new officer appointed in the fall of 1919. Our aim is to co-operate as far as possible with the provincial authorities in the matter of cow testing. Very substantial assistance has been rendered by the Departments of Agriculture of Quebec, Nova Scotia, and Manitoba. We have also co-operated with the Departments of Education in Nova Scotia and Manitoba with a view of interesting school children in this line of work. At a conference of deputy ministers of agriculture held in Ottawa in the spring of 1920 it was announced that whenever the provinces felt inclined to take over this work the Dominion Department would be glad to transfer it to them. In all probability several of the provinces will undertake the cow testing work in the near future. It would seem as though the provincial organization, with numerous field men at work, could handle the cow testing rather better than it can be handled from Ottawa.

Cold Storage

Owing to the resignation of the cold storage inspector on July 1, we have been obliged to mark time to some extent in this particular activity, pending the appointment of a successor by the Civil Service Commission.

A number of creameries have received the usual bonus for the erection of suitable cold storages.

Early in the year a complete list of the cold storage warehouses in Canada,

giving particulars as to size, equipment, and character of business carried on, was compiled and published for the information of those interested in such matters.

Refrigerator Car Services

The usual refrigerator car services for the carriage of butter in small lots and for the carriage of cheese in car loads were in operation throughout the warm months of the year. The iced butter cars were operated regularly on a weekly schedule over certain routes leading to Toronto, Montreal, and other markets. The shippers are charged the regular "less than car load" rates, and the department guarantees the railway two-thirds of the earnings of a full car load from starting point to destination. This service provides facilities for the shipment of small quantities of butter weekly under proper conditions. Without such an arrangement, shippers would have to provide their own refrigerator cars and hold the butter for sufficient time to accumulate a car load, or otherwise pay excessive charges on small quantities. The department accepts from the railway companies bills for the icing charges on a limited number of cars weekly for the carriage of cheese to Montreal.

Dairy News Letter

A new service which seems to be popular is the publication of a Dairy News Letter once a month, containing

news items relating to the dairying industry gleaned from journals, reports, correspondence, and other sources. This letter has been sent monthly to every cheese factory and creamery in Canada and to any person who applies to have his name put on the mailing list.

Dairy Market Reports

A Dairy Market Letter has also been issued weekly and telegraphic reports were sent out twice a week throughout the season. Paid telegrams are sent to designated officials in various districts from whom information can be obtained by cheese factory and creamery salesmen, or others who are interested in the market. "Collect" market telegrams are sent regularly twice a week to any person who makes a request for them. The Dairy Produce Market Letter sent out on Monday afternoons contains market information from the Montreal and Toronto markets up to one o'clock on that day. The report is sent regularly to any person who applies for it.

Dairy and Oleomargarine Laws

New regulations governing the sale of oleomargarine came into effect on September 11, 1920. It is now required that the word "Oleo" shall be stamped or impressed on the product itself in letters of specified size. The use of the words "butter," "creamery," "dairy," or the name of any breed of cattle is prohibited in any form of advertising or description of oleomargarine or on any package containing oleomargarine.

THE SEED PURCHASING COMMISSION

BY A. E. WILSON, COMMISSIONER AND CHIEF AGENT

OWING to the severe drought during the summer of 1919, which extended principally over the greater parts of southern Alberta and Saskatchewan and the southwestern part of Manitoba and to a lesser extent over smaller areas in other parts of the

three Prairie Provinces and caused a partial failure (and in many districts a complete failure) of the crops of wheat, barley, oats and rye, it was essential that substantial supplies of these grains, suitable for seed, should be purchased and special binned so as to insure the

seed requirements for the succeeding spring. With a view to securing the most suitable part of the crop for seed purposes before the grain began to move out in volume to the lake front and to the mills, purchasing was started on October 1, 1919.

All cars of grain before being purchased by the commission were carefully inspected by qualified seed inspectors at time of unloading as to their suitability for seed, and when found to be up to the seed standard as defined in the Seed Control Act, they were separately binned according to seed and commercial grades, and an "inward" seed certificate issued for each car. The seed was again inspected after being recleaned for shipment and an "outward" seed certificate issued guaranteeing its quality, purity and germination.

Through an arrangement with the Canadian Wheat Board and the railways, all cars of wheat passing through to the lake front and destined for the mills at Moose Jaw, Saskatoon, Medicine Hat and Calgary, during the month of October, were held up in the railway yards at these points for a preliminary inspection by seed inspectors, and those cars which they considered suitable for seed were diverted to the Government interior elevators to be re-inspected and special binned for account of the commission. A number of the cars so diverted were rejected as unsuitable for seed by the seed inspectors stationed at the elevators and placed in the commercial bins. This could not have been avoided, owing to the short time allowed by the railways for inspection in the yards and the large number of cars to be tested. The rejections were mainly on account of excess moisture content which it was impossible to test in the yards through lack of the usual facilities. These cars were turned over to the mills at first cost to us.

The surplus of seed wheat on hand at the end of the season was turned over to the Canadian Wheat Board on basis of cost (\$2.30 Fort William) plus

carrying charges at the rate of one fifteenth of a cent per bushel per day from date of purchase to date of sale. The difference between the selling price to the Board of this surplus and its market value on date of sale amounted to about \$100,000, which was turned into the "pool" created by the Canadian Wheat Board for account of the western farmers, thereby increasing the value of their participation certificates.

The action of this commission (which was approved by the Minister of Trade and Commerce and sanctioned by Order in Council) in effecting a minimum reduction of 40 cents per bushel on the price of seed wheat at country elevators in the drought areas to needy farmers, met with the general approval of those who harvested a crop, notwithstanding that this action would result in a reduction in the value of their participation certificates to the extent of the difference on the quantity sold for seed at country elevators, on the basis of \$2.45 Fort William (to which no carrying charges were added) and the prevailing prices to the mills of \$2.85 per bushel, and, later in the season, of \$3.15 per bushel.

With a view to reducing the cost of seed to a minimum, and in accordance with the recommendation of the Minister of Agriculture, the commission contributed to the funds of the Canadian Wheat Board the carrying charges on wheat sold for seed at country elevators and same were charged against the cost of our wheat stocks unsold at the time the agreement was made. The action of the commission in not increasing the selling price of seed wheat to meet the advance of 50 cents per bushel (and at a later date of 85 cents per bushel) made by the Wheat Board, enabled many farmers in the drought areas, who had not the means to pay a higher price, to secure their full seed wheat requirements and thus materially increase production.

As regards the seed oat situation, the demand was unusually heavy this

season, partly on account of the late spring. The commission was not quite able to meet the demand, notwithstanding that we had been in the market from September, 1919, to May 31, 1920, and offered substantial premiums for selected oats. Our system of offering a fixed premium over the market on date of purchase has proven most satisfactory from every standpoint, particularly as it has the effect of practically appointing every grain dealer in the West as a purchasing agent, thus encouraging them to separately bin the best of the crop, thereby enabling us to accumulate substantial supplies of selected seed and to avoid the heavy expense that would be involved in our maintaining a staff of travelling purchasing agents and the risk of loss through the different disadvantages of purchasing at country points. Our total purchases of seed oats amounted to 1,287,751.28 bushels, which represented a very high percentage of the oats, coming up to our seed standard as to quality, purity and germination, offered for sale from last year's crop.

I am pleased to state that our relations with the grain trade at Winnipeg and Calgary have been most satisfactory to all concerned, and that they willingly co-operated with us in securing the great bulk of our best available oats suitable for seed. The members of the grain trade operating in Western Canada have repeatedly expressed their approval of the work done by the commission in the general interests of agriculture, and stated that it would be practically impossible for private enterprises successfully to finance and hold over sufficient supplies of the best grades to meet the very extensive demand during the sowing season for seed of the high standard handled by this commission.

If we had not been in the market since early last fall a very substantial percentage of the best oats would have been ground at the mills and used for feed on the farms and thus lost to the

country for seed purposes. This would have resulted in a very serious shortage of seed oats this season and in a consequent decrease in acreage sown. The cost of seed to the farmers would also have been considerably higher.

There was a strong demand for seed barley and we had some difficulty in securing sufficient to fill all orders received by us, owing to the scarcity of barley suitable for seed purposes. A high percentage of last year's crop graded lower than 3 C.W. and it was difficult to secure a supply from stocks of 3 C.W. that would grade up to the seed standard.

We did not actually purchase a large stock of winter rye as there was no evidence of a demand up to the end of June, and as we did not wish to have a surplus of high-priced rye on our hands at the end of the season. Owing to high winds in the southwestern parts of Alberta in the early summer, a considerable acreage sown to wheat was blown out and the farmers in those districts decided to re-seed this acreage during August and September with winter rye. This resulted in a heavy and unexpected demand for seed. We immediately got into touch with the owners of available stocks in Alberta and Saskatchewan, and, in co-operation with the members of the grain trade at Calgary, arranged for the distribution of about 50,000 bushels through the blown-out areas, which was sufficient to fill all requirements.

The oats, barley, and rye were purchased from farmers, farmers' organizations, and elevator and grain companies (in their capacities as owners and as agents for farmers) and the wheat from the authorized agents of the Canadian Wheat Board. As all grain purchased by this Commission is specially selected by seed inspectors as being superior in quality, purity, and germination, premiums, varying from five to ten cents over the Fort William price on date of purchase, were paid on oats, barley, and rye, but no premiums were paid on

wheat, the price being the same as charged to the mills by the Canadian Wheat Board.

The Commission purchased 1,040,424.30 bushels of wheat, 1,287,751.28 bushels of oats, 17,197.26 bushels of barley, and 2,769.36 bushels of winter rye.

All sales were made on a strictly cash basis, payments being made in advance of shipments or by drafts attached to "order" bills of lading. A large percentage of our sales was made to farmers through municipalities, local grain growers' and other farmers' organizations, and through Provincial Governments. The balance was made direct to farmers and to departments of the Dominion Government. The seed distributed by the Commission has evidently given general satisfaction, as is evidenced by the large number of letters we have received expressing appreciation of its quality, purity, germination, and reasonable price.

We supplied a substantial percentage of the seed requirements of the returned soldiers, principally through the Soldier Settlement Board, this year at a discount under our regular selling prices, and the probabilities are that they will require much larger quantities next year, as very large areas of Indian, school, and new prairie lands will be under cultivation by then. It is scarcely necessary for me to refer to the importance of supplying these men going on to new land with good clean seed, and to the resultant benefits to the men themselves, as well as the Government, whose

security will be enhanced by the prosperity of these settlers.

This season our seed grain was distributed throughout the three prairie provinces, excepting a few carloads of wheat and oats to British Columbia, 50,000 bushels of seed wheat exported to farmers' organizations in Montana, and about 25,000 bushels of seed oats to points in Ontario and Quebec. With the exception of about 8,500 bushels, which were sold for feed, all oats purchased by the Commission were cleaned and sold for seed. 160,564.07 bushels No. 2 feed oats, representing the oat screenings which were cleaned from our seed stocks, were held over for a favourable market and sold for feed purposes at an average of about \$1 per bushel.

The Commission received, through the Department of Agriculture at Ottawa, various credits during the season amounting to \$3,807,000, and have up to this date returned, through the Receiver General, the sum of \$3,981,678.01. To the latter will be added the remaining assets, consisting of \$6,457.90, representing outstanding claims on railways; \$1,140.42, representing cash in bank; and \$3,120.39, representing value of sacks and grain on hand. The credit balance is thus \$185,396.78.

The cost of maintaining the Commission for the year was \$24,077.10, which included staff salaries, travelling and office expenses. The inspection service provided by the Seed Branch cost \$16,405.95. The net balance, \$144,913.73, would be sufficient to pay a fair rate of interest on the \$3,807,000 advanced on requisition of the Seed Commissioner.

"The Government of Canada has already embarked upon a plan of generous assistance to those of our returned men who wish to go upon the land, and I am glad to bear my tribute of acknowledgment that the work the Government has done in this respect appears on the whole to have been well justified."—Hon. T. A. Crerar, M.P.

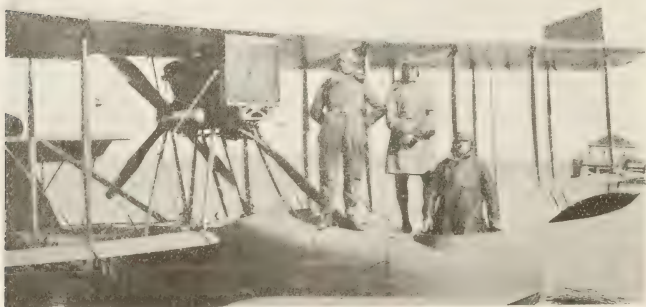
A SURVEY OF OUR FORESTS FROM THE AIR

BY J. M. SWAINE, CHIEF, DIVISION OF FOREST INSECTS

THROUGH the co-operation of the Air Board, the Commission of Conservation and the Entomological Branch, an interesting experiment in aerial forest reconnaissance was conducted last summer over the country north and west of lake Timiskaming in northern Ontario. The Air Board furnished a Curtiss flying boat, type F.3, with a wing spread of 78 feet, and equipped with a 360-h.p. Liberty engine. In addition to the pilot the machine carried two observers.

Messrs. R. D. Craig and S. H. Edgecombe conducted the forest reconnaissance for the Commission of Conservation, and the writer and Mr. M. B. Dunn that for the Forest Division of Insects of the Entomological Branch.

In connection with their survey of the forest resources of Ontario Messrs. Craig and Edgecombe determined the feasibility of aircraft work for the special investigation they were conducting. In four days' flying they mapped in the main timber types, such as con-



TYPE OF FLYING BOAT USED IN FOREST SURVEY

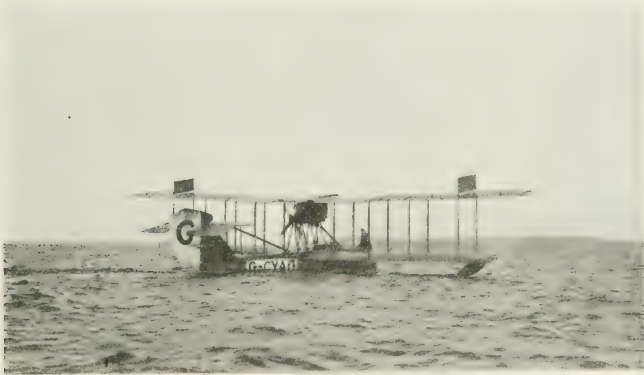
Colonel Robert Leckie, D.S.O., M.C., D.F.C., piloted the machine from Ottawa to Haileybury, with Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation, and the writer as passengers. The trip by way of Mattawa and North Bay, covering 336 miles, was made in five hours' flying time. Colonel Leckie had to return to Ottawa for his trans-Canada flight, and left Captain P. Wickens, A.F.C., as pilot. Later, Captain C. McEwen, M.C., D.F.C., relieved Captain Wickens.

ifers, hardwoods and mixed forests, recent burns, muskegs and clearings in approximately 1,800 square miles of the region around Temagami lake. At an altitude of 3,500 feet it was possible to distinguish the more conspicuous species of trees, and together with a limited amount of ground work in the various types, to secure a comprehensive knowledge of the forest conditions on a large area in a very short time. Three weeks were spent in the aerial survey about lake Timiskaming, and it is estimated

that to obtain the same amount of information by ground survey it would have taken two men at least eight months.

The officers of the Division of Forest Insects of the Entomological Branch studied an extensive spruce budworm outbreak spreading through the northern pulpwood forests from northern Quebec across the interprovincial boundary into Ontario. A strip of country more than 100 miles long and 25 miles wide had been freshly infested during the last two summers, and the injury was spreading westward. It was very important to determine the

spruce stands. There is the added drawback that the party cannot foretell how far or in which direction it must travel to reach the boundaries of the infestation, and it is, therefore, difficult to outfit properly. The possibilities of an air survey appealed to us strongly, and the results were even beyond our expectations. From a height of 3,500 feet it was possible to determine the different types of timber and to locate the blocks of spruce and balsam accurately. The budworm-infested trees are reddish or yellowish in colour, and from the air they were easily distinguished and the area of infestation could be readily



ON LAKE TEMISKAMING, NORTHERN ONTARIO

area covered by the outbreak last summer and to obtain definite data upon the rate and direction in which the injury was spreading.

A ground survey party attempted to obtain the information we required, but it was impossible to cover the whole area in that manner before winter. The spruce budworm outbreak spreads only in spruce and balsam. Much of the Temagami country carries strips of hardwoods with pine along the water courses, and since the latter offers the only available route for a rapid survey, it is evident that a ground party must have difficulty even in locating the balsam and

determined. The information thus easily obtained through a few days' flying would have taken two men more than six months to acquire by hard work by ground surveys.

The view from the air enables us to determine only the area attacked, and with some accuracy, the severity of the infestation. It is necessary to supplement this work by short ground surveys then easily planned and to study minutely the nature and effect of the injury.

It is not possible yet to foretell how far west this budworm infestation will spread, but it will probably reach the

Great Lakes within the next few years. It has apparently not yet affected the black spruce forest north of the height of land. If these air surveys can be continued each summer we can determine exactly, by a few flights during midsummer, the boundaries and rate of

of balsam and spruce over an area more than 100 miles long and 25 to 50 miles wide. To prevent the spread of the injury it would be necessary to destroy the majority of these caterpillars, and this could only be effected artificially by burning the spruce and balsam over all



FOREST IN THE TEMAGAMI REGION, NORTHERN ONTARIO, AS SEEN
FROM A HEIGHT OF 3,500 FEET

progress of the infestation, and this information will aid the limit holders to salvage their timber in time.

It is apparently impossible to check the spread of this outbreak through any practical artificial means yet known to us. The young caterpillars are hibernating in countless myriads on the twigs

this area, a proposal that is, of course, unthinkable. Adverse weather conditions, combined with parasites, may occur to control the outbreak in time to save most of the timber, or, lacking these natural control factors, it may sweep onward like a great fire and die out only through lack of food material.

“The farmer and his family are of more consequence even than the farm. Education both industrial and cultural, is necessary to intelligent farming and to development of mind.”—Dr. K. L. Butterfield, President, Massachusetts Agricultural College.

FLAX FIBRE AND TOW GRADING

BY ROBT. J. HUTCHINSON, CHIEF OF FIBRE DIVISION

IN Ireland and Belgium, where the inspection of flax is easily effected, the buyers and merchants visit the markets and select exactly what suits each spinner; but such a method is neither possible nor advisable in Canada, where fixed grades should be standardized. These in time will become known, and each mill owner can in this way build up a reputation for his particular marks.

The aim of Canadian growers should not be to produce the very highest quality of flax, such as Courtrai or Irish top grades, but, rather, good medium flax, equal to medium Belgian and Irish grades, of which very large quantities can be used. After grading, the flax is carefully tied in bundles, and is then ready for baling.

There are two principal grades of flax fibre, warp and weft, which are further subdivided according to qualities. Warp is generally broader fibred, stronger and more ribbony flax, and the yarn spun from this is used by weavers for the warp or longitudinal threads of the cloth. Weft is soft, more pliable flax, not necessarily so strong as warp, and is used for the yarn which goes in the shuttle running across the cloth, to fill it up.

In both warp and weft there are innumerable grades, and careful assortment is necessary in order to secure the full value of each quality of flax produced, because owing to the great variety of articles into which flax is manufactured, there is a demand for many different qualities, and what suits one spinner may not always suit another. In sorting flax, water-retted (either pond or running water) must be kept entirely separate from dew-retted, and on no account should these classes be mixed in the bales. It has already been pointed out that they colour differently

when the yarn made from them is boiled or bleached.

In judging flax the principal qualities are:—

- (1) Strength.
- (2) Weight for bulk.
- (3) Colour and uniformity.
- (4) Silkiness or oiliness.
- (5) Fineness and distinctness of separate fibres.
- (6) Length.
- (7) Cleanness.

Strength is the first requisite, and this can be accurately judged by the force and snap necessary to break a few of the fibres, for the value of flax is primarily dependent on its strength, and the grower must aim at securing this essential requirement. A strong flax is usually a weighty flax, and the first feel of the "head" when balanced in the hand gives a fair indication of both. The colour should be uniform, but spinners do not now attach so much importance to colour provided the flax has the required strength and quality. Silkiness and oiliness are essential to good spinning and yield, while dry bare fibre never gives the same results in working, and always lowers the value of the product. Fineness and distinctness of separate fibres are the real indication of quality, and can be judged by the splitting of the flax into separate fibres when rubbed with the finger-nail. Length generally characterizes good, well grown flax, but it is not of great importance, though, of course, a long flax generally gives a better yield per acre to the grower, as length signifies weight and an abundance of fibre. The subject of cleanness has been dealt with under scutching, and the thorough removal of all shive and dirt from the flax, especially at the root ends, must be insisted upon.

Grades—Water-retted qualities—

- W.P.A. Superior water-retted warp;
- W.P.B. Medium water-retted warp;
- W.P.C. Ordinary water-retted warp;
- W.T.A. Superior water-retted weft;
- W.T.B. Medium water-retted weft;
- W.T.C. Ordinary water-retted weft.

Dew-retted Qualities—

- D.P.A. Superior dew-retted warp;
- D.P.B. Medium dew-retted warp;
- D.P.C. Ordinary dew-retted warp;
- D.T.A. Superior dew-retted weft;
- D.T.B. Medium dew-retted weft;
- D.T.C. Ordinary dew-retted weft.

Recovery of Flax Tow

In the process of scutching a certain quantity of shorter and weaker fibres is pulled away by the scutching blades, and this material can be collected from behind the scutching mill and re-scutched. This is generally done on one or more scutching wheels kept for this purpose, and the material resulting from this is called "tow," which, when properly cleaned, is worth rather less

than half the value of flax. There is also a smaller amount of combings from cleaning the ends of the scutched flax, which is a much finer grade of tow, or pullings and should be kept separate.

The tow should be classified in two or three grades, the best or well cleaned material being packed separately from the inferior or dirty material to which shive still adheres, due to inadequate retting or other causes. In this case also, the tow from dew-retted and water-retted flax must be kept separate. A standard method of classifying tow might also be introduced into Canada.

TOW	
D.A. }	Superior dew-retted tow;
TOW	
D.B. }	Medium dew-retted tow;
TOW	
D.C. }	Ordinary dew-retted tow;
TOW	
W.A. }	Superior water-retted tow;
TOW	
W.B. }	Medium water-retted tow;
TOW	
W.C. }	Ordinary water-retted tow.

NEW VARIETIES OF FIBRE FLAX

BY DR. C. E. SAUNDERS, DOMINION CEREALIST

AT the time when the Flax Fibre Division of the Experimental Farms Branch was organized, the Dominion Cerealists was carrying on plant-breeding experiments in flax both for seed and for fibre. As these experiments had been in progress for some years, it was thought best for him to continue the work rather than to hand it over to the newly-formed division. Since that time, good progress has been made in selecting out promising strains from among the very large number of new cross-bred varieties which were obtained. Up to the present, such small quantities of these sorts were on hand that they had to be propagated

for seed only. Under such circumstances, a fair test of fibre quality cannot be made. It is proposed, therefore, commencing next season, to sow a series of plots of new varieties to be harvested for fibre purposes. Arrangements will be made to carry on the retting under suitable conditions so that the quality of the fibre derived from each of these varieties may be fairly representative, and so that the different sorts can be easily compared. It is believed that considerable advancement in the growing of flax for fibre can be attained by the introduction of pure, improved sorts of especially high quality for fibre production.

THE DISSEMINATION OF VARIETIES OF FRUITS, VEGETABLES AND FLOWERS

BY W. T. MACOUN, DOMINION HORTICULTURIST

MANY new varieties of horticultural plants have been originated in the Horticultural Division during the past thirty years, some of which have proved of great merit. A few of these have found their way into the trade, but the majority have not. The method of dissemination in the past has been to give a few plants or seeds to those who would be likely to take an interest in testing them with the understanding that a report be made in regard to their behaviour. This method is satisfactory until a variety has been proven to be desirable for commercial plantations, after which it is much too slow a way of getting things introduced into general cultivation.

It has, therefore, been decided to sell plants and seeds of promising new varieties in the future in the hope that this will be a better way of drawing

attention to their merits and ensure their coming more quickly into prominence. After a variety is listed by the principal nurserymen it is proposed to discontinue the sale of it from the Experimental Farms.

While there will be little to offer for sale in the spring of 1921, it is expected that by the autumn a considerable number of plants of gooseberries, currants and raspberries will be for sale, but plants of the Portia strawberry will be offered in the spring. This variety has proven the best canning variety tested at Ottawa and Vineland. It is handsome in appearance, of good quality, and a good cropper.

Provision has been made for beginning the propagation of a much larger number of plants of the new varieties than has been possible in the past.

EFFECT OF DIPPING ON THE PRODUCTION OF MILCH COWS

BY DR. F. TORRANCE, VETERINARY DIRECTOR GENERAL

DURING the dipping of cattle for the eradication of mange in the southern part of the province of Alberta, careful records were

kept of the milk production of eighty-seven dairy cows for two days preceding and two days after dipping, and the following figures were obtained:—

Total milk produced by the 87 cows:—

	June 24	June 25	June 26	June 27
	3,128.4 lb.	3,161.4 lb.	3,051.9 lb.	3,113.6 lb.
Average per cow..	35.15 "	34.84 "	34.27 "	34.98 "

This shows the effect on milk production of the dipping of this dairy herd in the official lime and sulphur solution in the standard cage vat when the temperature was maintained at from 110° Fah. to 118° Fah.

It is evident that the objection of many stockmen to the dipping of milch cows is not well founded, as they can be dipped without affecting the secretion of milk to any appreciable extent.

EXPLORATION FOR NEW PLANTS

BY W. T. MACOUN, DOMINION HORTICULTURIST

A NEW line of work begun by the Horticultural Division in 1920 is the systematic search for promising forms of wild native fruits, flowers, trees, and shrubs. Canada has been far behind other countries in this respect. Explorers have for many years been sent in search of new plants to many parts of the world from Great Britain and the United States, and a vast number of valuable new plants have been discovered and brought together through this means. The United States has had explorers in Canada during recent years to search for wild fruits, especially in the colder parts of Canada,

that would be useful for them in their breeding work, as it is believed that the native material offers a very rich field for obtaining new characters in cultivated plants. Mr. W. J. Boughen, Valley River, Man., was employed to carry on this work for the Horticultural Division in 1920. He travelled during the growing season about the provinces of Manitoba, Saskatchewan and Alberta, and collected a large amount of promising material, part of which was sent to the Experimental Station, Morden, Man., and part to the Central Experimental Farm, Ottawa. It is planned to continue this work in 1921.

IMPROVED TRANSPORTATION SERVICE

BY G. E. MCINTOSH, FRUIT TRANSPORTATION SPECIALIST

TRANSPORTATION as applied to fruit and vegetables is recognized as of such importance to the industries concerned that for three and a half years a division of the Fruit Branch has been devoted entirely to its interests. This division constitutes an intermediary between the shipper and the carrier through which by closer co-operation the many problems relative to the successful marketing of these products are more clearly understood. It is the constant effort of the division to reduce to a minimum the waste made out of transportation and to develop the best possible transportation service for these perishable products.

The relation between the fruit and vegetable producer and cheap, rapid, safe transportation is most intimate. It cannot be too much so. The farmer or fruit grower must have an outlet for his crop. The transportation companies, on the other hand, are somewhat dependent upon the prosperity of these industries in some

of the regions through which they pass. The manifestation of interest by the transportation companies operating in Canada in the development and success of the fruit and vegetable industries, has been quite pronounced. This interest has been shown in our work from time to time and especially within the past few months in their united efforts to facilitate and encourage all phases of the work of investigation and experimentation; to assemble cars and amend tariffs to protect fruit shipments.

What the railroads and express companies have done and are doing, in the way of providing more efficient service, is appreciated in the producing centres throughout the different provinces, but the grower and shipper of perishable foodstuffs, because of the perishable nature of his product, deserves, and must have, every reasonable consideration by carriers. His product requires traffic arrangements from time to time whereby shipments will be handled

expeditiously from producing districts to more distant consuming markets. The Transportation Division of the Fruit Branch endeavours to negotiate these matters when the necessity is proven. For the mutual benefit, therefore, of shippers and carrier, it has recently been possible to improve marketing conditions for the fruit and vegetable growers as follows:—

At Grimsby Beach, Ont., a new Grand Trunk Railway siding to accommodate approximately 15 cars and a fruit express shelter 100 x 20 feet are now under construction. Up to the present there have been no freight loading facilities on Grand Trunk tracks, while the express facilities have also been unsatisfactory.

Special commodity rates have been established applying on shipments of tobacco stems for fertilizing purposes from Montreal, St. John, Farnham, Granby and Quebec to points in the Leamington, Ont., district.

An extension of marketing privileges for Ontario fruits and vegetables has been brought about by the Canadian Express Company establishing carload commodity rates from producing centres to Weyburn, Calgary and Edmonton. Ontario field tomatoes under this arrangement can be marketed in Alberta in competition with tomatoes from the Western States.

An adjustment of freight rates on manure, of which there is a tremendous tonnage for orchard fertilization, was arranged on shipments from Toronto to St. Catharines and points on the Niagara, St. Catharines and Toronto railway.

Tariff provision was obtained for through carload shipping of berries and cherries from British Columbia points to Minneapolis and Chicago.

The Express Companies, while not applying the carload rate, extended the special carload privileges to cover shipments of apricots and plums from points in British Columbia to the Prairies, resulting in a much better distribution and more satisfactory returns to growers.

Improved track and shelter accommodation has been provided at Aldershot, Ont.

The special freight rate on fresh fruits from Ontario points to Winnipeg, Portage la Prairie and Brandon has been maintained by an order of the Board of Railway Commissioners.

Keremeos, B.C., has been accorded improved express and freight service to Vancouver via Princeton and to Calgary and Edmonton.

The special carload express rates for shipments of cherries, berries and currants, moving from British Columbia points to Prairie markets, which it was announced would be discontinued, were re-established for the season of 1920.

PART II

Provincial Government Departments

THE ORGANIZATION OF PROVINCIAL DEPARTMENTS OF AGRICULTURE

The Departments of Agriculture of the provinces of Canada are organized and carried on according to a more or less uniform system varying in accordance with the legislation governing their functions and the direction given to the work by the heads of the respective departments. The differences, if studied side by side, may in some instances lead to modifications. The variation between the departments is more pronounced in the work accomplished and the methods of administration.

It is one of the functions of The Agricultural Gazette, for the purposes of comparative study, to record the actual doings of these departments. In the following articles there has been brought together the present organization of these departments, with a brief indication of the work carried on by each branch and division.

NOVA SCOTIA

BY DR. M. CUMMING, SECRETARY FOR AGRICULTURE.

THE Department of Agriculture of Nova Scotia is presided over by the Hon. G. H. Murray, Premier of the province. The Secretary of Agriculture, who corresponds to the Deputy Minister of other provinces, is Dr. Melville Cumming, who is also Principal of the Nova Scotia Agricultural College. In addition to his general executive duties, as Secretary, Dr. Cumming takes charge of crop statistics, stallion enrolment, and the supervision of the work of the agricultural representatives.

The Department is divided into six main branches: (1) Agricultural Societies, Exhibitions and Associations, (2) Horticultural Branch, (3) Entomological Branch, (4) Dairying Branch, (5) Poultry Branch, (6) Women's Institutes.

The Superintendent of Agricultural Societies, Exhibitions and Associations is Mr. F. L. Fuller. The Agricultural Societies, of which there are 269 in the province, exist mainly for live stock improvement. The Super-

intendent assists where necessary the work of these societies, receives and prepares annual statements, and allots government grants. As Superintendent of Exhibitions this officer administers the county exhibitions in the matter of arranging dates, the appointment of judges, and the allotment of grants. As Superintendent of Associations he receives statements of county Farmers' Associations, allots grants and arranges field crop competitions.

Horticultural Branch.—Mr. P. J. Shaw, the Provincial Horticulturist has supervision over 34 model orchards established throughout the province. He also carries on demonstration work in gardening and orcharding.

Entomological Branch.—The Provincial Entomologist, Mr. W. H. Brittain, administers the Insect Pest and Plant Disease Act, and carries on investigations in insect life, spraying, sprays, and gives demonstrations in these matters.

Dairying Branch.—The Superintendent of Dairying, Mr. W. A. MacKay, has as an assistant Mr. W. J. Bird. The functions of this Branch include the fostering of creameries and cheese factories. The Branch operates three government creameries in Cape Breton. The Superintendent is the secretary of the Provincial Dairymen's Association.

Poultry Branch.—The Superintendent of Poultry, Mr. J. P. Landry, is the head of all organized provincial work for poultry improvement. His duties include the arranging of dates of poultry exhibitions, the appointment and placing of poultry judges, superintending the distribution of eggs and the carrying on of educational work in other directions.

Women's Institutes.—The Superintendent of Women's Institutes is

Miss Helen J. Macdougall. Her duties include the oversight of all activities in connection with Women's Institutes in the province, including the holding of educational courses in household science and similar activities.

The Department of Agriculture and the Nova Scotia Agricultural College are closely identified. So much so indeed that the site of both is at Truro, N.S., and several of the heads of the departments in the general service are also heads of the departments in the College. The College gives a two-year course in agriculture, carries on an extensive farm devoted to the breeding and rearing of all classes of live stock and poultry, and the cultivation of all classes of crops adaptable to Nova Scotia conditions.

NEW BRUNSWICK

BY O. C. HICKS, B.S.A., SUPERINTENDENT, SOIL AND CROP DIVISION

THE head of the Department of Agriculture of New Brunswick is the Hon. D. W. Mersereau. In this province the Deputy Minister is designated the Secretary for Agriculture. This office is held by Mr. Harvey Mitchell. The various branches of the department, the officers in charge of these, and the work undertaken by each branch are given.

Immigration and Farm Settlement. F. E. Sharp, Superintendent. The activities of this branch are carried on in conjunction with the office of the Agent General for New Brunswick in Great Britain. The Superintendent looks after the receiving and placing of farm settlers, farm hands and domestic servants when they arrive in the province.

Elementary Agricultural Education Branch. A. C. Gorham, M.Sc., Director. In close relationship with the

Board of Education, the director provides for elementary instruction in nature study and agriculture in the rural schools, conducts summer courses of study for teachers and prescribes a course of instruction for Grades I-VIII, administers grants to teachers who maintain school gardens, or who secure special instruction in gardening and agriculture at rural science schools.

Agricultural Societies Branch. M. A. MacLeod, Superintendent. This branch administers the grants to 154 agricultural societies. Conducts standing field crop competitions and confers on conventions and educational work such as exhibitions and seed fairs among the societies.

Dairy Division. George Thimens, Superintendent. The Superintendent of the Dairy Division gives instruction and assistance in the establishing and working of associations organized

for the manufacture of butter and cheese in creameries and factories.

Live Stock Division, J. H. King, B.S.A., Superintendent. This Branch has charge of the enforcement of the Stallion Enrolment Act, gives encouragement to the use of pure bred sires, and assists in the co-operative marketing of wool in the province.

Horticulture Division, A. G. Turney, B.S.A., Provincial Horticulturist. The Division of Horticulture gives assistance to the orchard industry in planting, cultivation, spraying and marketing. Holds short courses for instruction, cares for demonstration and illustration orchards, aids co-operative buying of spray material for members of the Horticultural Society.

Soils and Crops Division, O. C. Hicks, B.S.A., Instructor. This Division conducts co-operative demonstration work in field crops. Encourages the production and use of superior seeds.

Drainage Demonstrator, John Woods. This official devotes his entire time

to further the campaign for the installation of tile drains.

Poultry Division, (Superintendent, vacant). The Superintendent encourages and assists the development of the poultry industry.

Apiary Division, L. T. Floyd, Provincial Apiarist. This division encourages and assists the apiary industry. Carries out apiary inspection under the Act for the Suppression of Infectious and Contagious Diseases among Bees, and for the Protection of Bees.

Women's Institute Branch, Miss Hazel McCain, Supervisor. This branch supervises the work of 132 branch institutes, holds short courses in household science, and arranges educational work relating to the home.

Entomological Branch, William McIntosh, Provincial Entomologist. The Provincial Entomologist investigates cases of insect infestation, and advises on methods of prevention and control. Confers on educational work relating to biological subjects.

QUEBEC

BY ARMAND LETOURNEAU, B.S.A., DIRECTOR OF THE "JOURNAL OF AGRICULTURE"

THE Department of Agriculture is the centre of the agricultural movement in the province of Quebec. It is in the department that all movements and activities for the betterment of methods for increasing agricultural production are initiated. The department includes: (1) a Minister; (2) a Deputy Minister; (3) a Secretary.

The work of the department is divided among the following officers, responsible to the Deputy Minister, who is himself responsible for the general administration of the department to the Minister of Agriculture: the chief of the Dairy division; chief of

the Division of Agronomy; chief of the Live Stock division (which is being formed); the chief of the Horticultural division; chief of the Poultry division; chief of the Bee and Maple Sugar division; director of Short Courses; secretary of the Council of Agriculture; director of the "Journal of Agriculture."

The following is a brief summary of the activities of these various divisions:

The Dairy Division

The most important branch of the development that has taken during

the past few years is that of dairying, which includes the following organizations: the Dairymen's Association, the Dairy school at St-Hyacinthe and the Inspection service of butter and cheese factories.

Dairymen's Association.—The Dairymen's Association is the nucleus or basis of the growth of the dairy industry in the province. It was established in 1882, with the object of encouraging and improving the butter and cheese industry and the manufacture of all other dairy produce. It has done very useful work in this line. Up to the present, the Dairymen's Association has splendidly fulfilled its object by establishing the dairy school of St-Hyacinthe and perfecting the inspection system of butter and cheese factories.

Dairy School.—To improve the quality of butter and cheese produced in the province of Quebec, it was necessary to train skilled and competent makers. Such was the object of the St-Hyacinthe dairy school. This school has trained a host of makers who are today disseminated in all parts of the province. They are among the group of workers who have so largely contributed to making our dairy products favourably known on foreign markets and especially on English markets.

A laboratory of chemistry has been added to the school, to conduct scientific experiments in the treatment of milk. Later on, this laboratory was enlarged and analyses were made for the farmers. This laboratory, which is in charge of an official chemist, is known today by the name of the "Provincial Laboratory."

Factory Inspection.—The regular inspection of butter and cheese factories has always been recognized as an indispensable factor towards the improvement of dairy produce. There are 54 inspectors doing this work under the supervision

of two general inspectors. The inspectors are salaried officials and inspection is compulsory.

In the province of Quebec, we have suffered from what may be called the "plague of small factories." The elimination of second and third rate factories was another one of the improvements effected in the making of dairy produce. The owners of small factories must have a profit, no matter how small the quantity of milk they receive, and as a result these factories are poorly built, poorly equipped, they have poor makers and, of course, the quality of the produce is poor. The registration of factories and the issuing of licenses to persons recognized as competent have been the main remedies to this condition of things. Poor factories are now being gradually eliminated and the products are rapidly improving in quality.

The important part taken by the Quebec Cheesemakers' Cooperative Association in the improvement of our dairy products should be mentioned here. Before this association was organized, dairy products were sold ungraded; all products, whether poor or good, obtained the same price on the market. As a result of the organization of this cooperative association in 1910, products were graded and sold by grades, according to their quality. The encouragement that such a measure has given the good makers may easily be realized. They were able to secure top prices for their products whilst poor makers were compelled to improve their products or close their factories. The result was a marked improvement in the quality of marketable dairy products and the elimination of undesirable small factories.

The Division of Agronomy

This division, the second in importance in the department, is still in the organizing stage, being established

only in February, 1920. It now includes three sections, as follows: (a) cereals; (b) fodder plants; (c) farm buildings.

The staff includes a chief for the general direction, a specialist in fodder plants, a lecturer and four instructors.

The cereal section promotes the production and trade of selected seed through: (a) The establishment of demonstration plots, (b) The organization of centres of production, (c) The organization, throughout the province, of seed crop competitions. The work of the cereal division is done in close co-operation with the agricultural associations and the farmers' clubs.

The fodder plant division deals with the production of grasses and leguminous plants, fodder corn and roots. Its work is done through the following: (a) The establishment of demonstration plots, (b) Demonstrations in the threshing of clover seed, (c) Various methods to encourage the construction of silos. The section of rural construction employs experts who prepare plans and specifications of up-to-date farm buildings for farmers. Special grants are provided for the organization of modern stable competitions.

The Division of Agronomy also deals with all questions pertaining to rural economy, systems of culture, rotations, fertilizers, etc. Ploughing competitions are organized as well as various other activities.

The Live Stock Branch

This division is now in the process of formation. It includes: (a) an instructor in sheep husbandry; (b) an instructor in horse husbandry.

Two officials of the Secretary's Office of the Council of Agriculture look after the interest of cattle breeding. This division will be extended later on.

The Horticultural Division

The organization of the division of Horticulture has been through the same stages as all the divisions established up to the present by the Department of Agriculture. There was, at first, a chief horticulturist, whose duty was to encourage the planting, on each farm were conditions were favourable, of an orchard, a vegetable garden and a lawn, for domestic utility and for beautifying the home. Various changes were made from year to year until the division was complete with the following sections: (a) Horticulture, or gardening; (b) fruit culture; (c) preserving and canning of vegetables and fruit; (d) school gardens; (e) entomology, or section of disease and injurious insects (f) horticultural societies.

All these sections have a common object which is the following: (a) to encourage the growing of food plants for the home; (b) to teach practical methods of production and canning; (c) to create a liking for agriculture among the children, by the establishment of school gardens and home gardens, and school fairs.

There are now in the province 61 demonstration plots on the growing of small fruit, 28 demonstration plots on fruit culture; 42 demonstration plots on the growing of potatoes, and 10 on tobacco growing.

In 1920, the following were sold or distributed to the twenty-five horticultural associations now in operation: 17,425 apple trees, 250,000 strawberry plants.

The school garden section has organized during 1920 in sixty counties of the province, a total of 29,687 school gardens or home gardens.

The Poultry Division

The Poultry Division had its beginning in the Quebec Farmers' Experimental Union. Since it was organized in 1911, the Union has endeavoured,

by means of small premiums, and by educational work through the newspapers, to improve the methods of poultry management. Efforts were made to establish, in each parish of the province, an up-to-date poultry house called the "cold poultry house". The following year, twenty-two poultry fattening stations were organized. The poultry division was definitely organized in 1914. Sixteen breeding stations were established during the year and grants were distributed to thirty-nine domestic science schools and the normal schools in Quebec and Montreal to enable them to establish modern poultry plants. Distributions of sittings of eggs to school children were also inaugurated during the same year. The object of this division is to encourage the breeding of poultry of the most suitable breeds for the province of Quebec, to promote modern methods of egg production and fattening of poultry. A number of instructors are employed each year to give demonstrations on caponizing, slaughtering, and packing of fowls for the market.

In co-operation with the Experimental Union, the Poultry Division builds standard poultry houses in the parts of the province where such buildings are not known. It also comes to the assistance of organizers of poultry exhibitions and suggests the adoption of changes, in order to encourage the farmers, by special classes and valuable prizes, without neglecting the fancier.

Short Courses

Each year, from December to April, a score of lecturers, instructors and demonstrators go through the country giving a series of short courses in each locality. Such lectures are illustrated by projections by means of slides, and as many practical demonstrations as possible are given. Last year, these lecturers gave 386 lectures, they visited 312 farms, and

gave 68 demonstrations. The total attendance was 25,912 persons.

The Secretaryship of the Council of Agriculture

The oldest branch of the Department is the Council of Agriculture. It was the origin of all others. The Council of Agriculture is composed of 24 members, 21 of whom are appointed by the Lieutenant-Governor in Council, selected among the prominent agriculturists of the province; the Minister of Agriculture the Superintendent of Public Instruction, and the Deputy Minister of Agriculture are ex-officio members of the Council. The main duty of these officers is to revise the regulations regarding agricultural associations and farmers' clubs.

The chief administrator of the Council of Agriculture is the Secretary, who belongs to the staff of the department. He supervises the distribution of grants to the agricultural associations and farmers' clubs and also the work of these organizations. He also takes charge of the organization of competitions and of the management of fairs and exhibitions. The Agricultural Merit is also under the direction of the Council of Agriculture.

The Journal of Agriculture

The principal organ of the agricultural associations and farmers' clubs is the Journal of Agriculture, the oldest review of the kind, established in 1878. It is published in two editions, French and English, and has now almost 100,000 subscribers. It deals chiefly with the interests of the farmers of the province and with all things connected with the land. In the 100,000 homes where it enters, the Journal of Agriculture is the advocate of good methods and the champion of rural tradition.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER

THE Minister of Agriculture is the Honourable Manning W. Doherty; the Deputy Minister is Mr. W. Bert Roadhouse; and the Secretary of the Department is J. C. Boylen. The Department conducts the affairs of the agricultural and veterinary colleges, the agricultural schools, and of various branches at headquarters.

Ontario Agricultural College, Guelph, J. B. Reynolds, M.A., President. Conducts two-year and four-year courses and numerous short courses on all phases of agriculture; also three months, one-year and two-year courses for girls in domestic science. Affiliated with the University of Toronto which grants the degree of B.S.A. for the four-year course in agriculture. Also conducts experimental plots in field crops and carries on a great deal of experimental work in the laboratories and in the feeding and handling of live stock.

Ontario Veterinary College, Toronto, C. D. McGilvray, V.S., M.D.V., Principal. Affiliated with the University of Toronto. Conducts four-year course in veterinary science. Degree conferred by University of Toronto.

Agricultural School, Kempville, W. J. Bell, B.S.A., Principal. Opened in the fall of 1920. Intended to give a practical two-year course for boys intending to return to their own farms and will also give short courses, but no degree course. Operates 200 acre farm in connection with the school in order to demonstrate the best methods of breeding and feeding.

Agricultural Societies Branch, J. Lockie Wilson, Superintendent. Administers grants to and work in connection with 350 Agricultural

Societies in the province, also grants to 100 Horticultural Societies, Ontario Vegetable Growers' Association and Ontario Ploughmen's Association. Arranges conventions and educational work in connection with these subjects and also large provincial ploughing match and tractor demonstration.

Live stock Branch, R. W. Wade, B.S.A., Director. Manages the Ontario Provincial Winter Fair at Guelph and supervises work in connection with grants to smaller winter fairs, poultry associations and horse shows. Assists Ontario Sheep Breeders' Association in wool marketing. Has charge of the enforcement of the Stallion Enrolment Act, the carrying on of the Scrub Bull Campaign and other matters of special interest to the live stock industry.

Institutes and Dairy Branch, G. A. Putnam, B.S.A., Superintendent. Supervises work of Women's Institutes, Boards of Agriculture, Farmers' Clubs, and arranges large numbers of meetings and short courses held in connection with these organizations, also supervises work of dairy instruction, butter grading, enforcement of the Milk and Cream Purchase Act, Eastern Dairy School and other matters affecting the dairy industry.

Fruit Branch, P. W. Hodgetts, B.S.A., Director. Has charge of demonstration orchards conducted to give instruction in the best methods of orcharding, supervises Horticultural Experiment Station, Vineland, also work of apiary inspection and instruction and manages fruit exhibition conducted under the auspices of the Ontario Horticultural Association.

Cooperation and Markets Branch, F. C. Hart, B.S.A., Director. Gives instruction in cooperative organization and in the marketing of farm products.

Statistics and Publications Branch, W. O. Galloway, B.A., Director. Compiles agricultural statistics for the province and issues crop reports. Supervises the printing and mailing of the publications issued by the department.

Agricultural Representatives Branch, R. S. Duncan, B.S.A., Director. Supervises and directs the work of 48 local offices located in almost every county in the province.

Vegetable Specialist, A. H. McLennan, B.S.A. Devotes entire time to assisting those engaged in vegetable growing commercially, especially the market gardeners of the province, carries on demonstrations in methods of cultivation and fertilization and combatting disease.

Colonization and Immigration, H. A. Macdonell, Director. Works in conjunction with the office of the Agent-General for Ontario in Great Britain and looks after the receiving and placing of farm settlers, farm hands and domestic servants when they arrive in Ontario.

MANITOBA

BY GEORGE BATHO, EDITOR OF PUBLICATIONS

IN the province of Manitoba, agriculture and immigration are embodied in one department under the Hon. G. J. H. Malcolm as Minister. The Deputy Minister of the department is Mr. J. H. Evans, B.S.A.

In addition to the general work of organizing policies, drafting legislation, and supervising the whole work of the department, there attach directly to the offices of the Minister and the Deputy Minister some lines of detail administration. During 1920 these included such matters as direction of grasshopper destruction, purchase and distribution of feed and

supplies for needy districts, supervision of demonstration farms, promotion of agricultural trade, administration of Farm Implements Act and Produce Dealers' Act, and issuing of royalty coupons on furs.

Manitoba Agricultural College, Winnipeg, John Bracken, B.S.A., President. Regular Courses: In agriculture, a diploma course of three years and a degree course of five years; in home economics, a diploma course of two years, a course in institutional management of three years, and a degree course of five years. Special short courses on many phases of agriculture and home economics. Correspondence courses on many subjects. Experimental field plot work; seed testing; plant breeding; experiments in animal feeding, poultry, dairying, horticulture, physics; soil analysis, etc. Preparation of manuscripts for bulletins; correspondence on agriculture and home economics subjects; addresses at meetings, and other miscellaneous activities. Affiliated with the University of Manitoba, which grants the degrees both in agriculture and in household science.

Agricultural Extension Service, S. T. Newton, Director. Conducts short course schools at local points, demonstrates, conducts agricultural chatauquas; administers the Agricultural Society Act and the Home Economics Society Act; directs and assists in carrying on Boys' and Girls' Club work. Prepares and stages provincial exhibits both within the province and elsewhere. Supervises campaigns to destroy gophers, crows and farm pests. Directs the work of agricultural representatives. Maintains and circulates travelling libraries.

Dairy Branch, L. A. Gibson, Dairy Commissioner. Administers the Dairy Act. Assists in organizing and supervising creameries, cheese factories and skimming stations. Conducts provincial butter grading,

correspondence, instruction and general work along dairy lines.

Weeds Commission, S. A. Bedford, Geo. Walton, H. B. Brown, Commissioners. Administers the Noxious Weeds Act. Supervises municipal weed inspectors. Inspects seeds and seed grain, conducts meetings and carries on educational work.

Publications and Statistics Branch, Geo. Batho, Agricultural Editor. Edits, illustrates and supervises the printing and mailing of agricultural and home economics literature, departmental reports and other printing and advertising. Compiles agricultural statistics and crop reports.

Live Stock Branch, W. W. Fraser, Live Stock Commissioner. Administers several acts relating to the live stock industry; issues animal brands; assists farmers to stock farms with animals; handles the work for the Stallion Enrolment Board. One division under Mr. S. G. Sims devotes its entire energy to administering the Settlers' Purchase Act.

Game Branch, Miss A. Cole, Secretary. Issues game licenses and receives reports from holders thereof; issues permits for export of pelts. Supervises publications in connection with the Game Branch.

Employment Service of Canada, (Manitoba Branch), J. A. Bowman, Superintendent. The Employment Service of Canada is carried on under the joint auspices of the Dominion and provincial governments. The Manitoba Branch takes charge within the province of directing applicants for work to where it may be obtained and endeavours to find workers for such industries as are in need of employees.

SASKATCHEWAN

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THE Department of Agriculture, Saskatchewan, headed by a Minister and Deputy Minister, is divided into six principal

branches. Following are the administrative officers: Minister, the Honourable C. M. Hamilton; Deputy Minister, F. H. Auld; Live Stock Commissioner, J. G. Robertson; Field Crop Commissioner, M. P. Tullis; Dairy Commissioner, P. E. Reed; Co-operative Organization and Markets Commissioner, J. F. Booth; Secretary and Acting Deputy, Statistics Branch, Edward Oliver; Chief Game Guardian, F. Bradshaw; Secretary, Organization Department, Miss Isabel Cummings.

Live Stock Branch.—The staff of the Live Stock Branch includes in addition to the Commissioner, one assistant, two veterinarians, and five buyers and inspectors. Under the head of distribution grade female cattle are purchased and distributed as are also sheep and hogs of improved breeding. Through the Live Stock Associations the Branch handles auction sales of all classes of live stock raised by farmers in the province. Representative specimens of such animals as are thus handled are collected and displayed at the larger exhibitions. The Branch also takes charge of the enrolment and licensing of stallions. With a view to the prevention of blackleg in cattle and hemorrhagic septicemia in horses, the Veterinary Division of the Branch supplies at cost preventive inoculation filtrates. The Brand Act is administered by this Branch which is also charged with such special duties as affording relief in the way of supplying feed to districts that have suffered from drought.

The Field Crops Branch.—The Commissioner directs the work of eighteen Field Representatives. This Branch exercises weed control; directs the gopher destruction campaign; distributes relief supplies of seed, and other requirements, to dried out areas; and makes exhibits representing the work of the Branch at the larger exhibitions.

Dairy Branch.—The Dairy Commissioner is assisted by a chief butter grader, two assistants, and three instructors. Butter grading stations are operated at Regina and Saskatoon. Dairy instruction cars are run from time to time on lines of railway. Dairy meetings are held. Instruction is given at cream buying stations and creameries and to producers and handlers in producing dairy products. The Branch co-operates with the Poultry Division of the University of Saskatchewan in extension work. Educational work is carried on in co-operation with the Saskatchewan Dairymen's Association. Creamery operators' and producers' competitions are managed, boys' and girls' judging competitions directed and dairy exhibits for the larger shows are organized.

Game Branch.—The staff of the Game Branch consists of a chief game guardian, an assistant game guardian, six salaried game guardians, 350 voluntary game guardians, and a provincial naturalist. The work comprises the administration of the "Game Act" and the "Useful Birds Act," the supervision of the provincial museum and educational work consisting of lectures on the preservation of useful wild life, and distribution of bulletins, posters, etc.

Bureau of Statistics Branch collects, compiles and publishes statistics of crops and live stock, and adjustments are made between debtors and creditors.

Co-operative Organization Branch.—This Branch gathers and disseminates information in regard to the organization and operation of crop producing, purchasing and marketing associations. Co-operative Associations organized in the province are registered. Special attention is given to encouraging co-operative live stock and wool marketing. Helpful bulletins are prepared and distributed.

ALBERTA

BY JAMES MCCAIG, M.A., EDITOR OF PUBLICATIONS

THE Department of Agriculture of Alberta is administered by Honourable Duncan Marshall, with Mr. H. A. Craig, B.S.A., as Deputy Minister; the Assistant Deputy Minister and Secretary of the Department is Mr. Z. McIlmoyle. The respective administrative officers and the work for which each is responsible are shown below:—

Provincial Dairy Commissioner, C. P. Marker, Calgary. The Dairy Commissioner assists by education, direction and inspection the total dairy interests of the province. He markets creamery butter consigned to him and grades all samples of either dairy or factory butter for producers.

The Live Stock Commissioner, S. G. Carlyle. The Live Stock Commissioner administers the Live Stock Encouragement Act and gives direction and assistance to the breeding and improvement of live stock in the province.

The Provincial Veterinarian, P. R. Talbot, V.S. The Provincial Veterinarian attends to the health of farm animals in the province by advice and direction where veterinary surgeons are not available, but not including animals suffering from contagious diseases. He also lectures in the Schools of Agriculture and at the University.

The Superintendent of Agricultural Schools and Demonstration Farms, A. E. Meyer, LL.B. The Superintendent of Agricultural Schools and Demonstration Farms directs the work of six agricultural schools and institutional farms attached to them as well as a number of other demonstration farms in the province.

Director of Demonstration Farms, D. Douglas. It is the business of the Director to supervise under the Superintendent the management of

the institutional farms attached to the schools and also the other demonstration farms of the provincial Department of Agriculture.

Superintendent of Seed and Weed Branch, J. D. Smith. The Superintendent of the Seed and Weed Branch administers the Noxious Weed Act, encourages the production and exchange of pure seed, conducts field grain competitions and assists in the moving and marketing of feed and seed products.

Crop Reporter and Statistician, J. McCaig. It is the duty of this office to issue within the crop season semi-monthly reports of conditions relating to farm operations, crops and live stock, and to co-operate with the Dominion Department of Agriculture in the issue of final annual crop and live stock figures.

The Poultry Commissioner, J. H. Hare. The Poultry Commissioner encourages the production of poultry and eggs, organizes associations for marketing and conducts grading stations for the marketing of consigned eggs and poultry.

The Superintendent of Fairs and Institutes, A. Galbraith. The work of this office is concerned with the direction and encouragement of agricultural fairs and exhibitions and of affording financial assistance. The Superintendent also conducts demonstration trains, short course schools, institutes and excursions.

The Superintendent of Women's Institutes, Miss Mary MacIsaacs. It is the work of this branch to organize and conduct institutes, to arrange and carry out courses of lectures and demonstrations and to organize and direct the work of nine girls' clubs throughout the province.

The Provincial Game Guardian, B. Lawton. The Provincial Game Guardian administers the game laws of the province. He is also fire guardian

Recorder of Brands, J. Wilson. It is the duty of this officer to allot and record brands and to register transfers.

Publicity Commissioner and Editor of Publications, J. McCaig. It is the business of this office to furnish information with respect to the agricultural and other resources and opportunities in the province and to edit and distribute agricultural and other publications.

BRITISH COLUMBIA

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

WHILST "Agriculture" has been included in the portfolio of the Minister of Finance and Agriculture for the Province of British Columbia since the year 1873, noticeable activities were not shown until 1891 under the administration of the Hon. J. H. Turner, who was subsequently for so many years the Agent General for British Columbia in London, England.

For a long period the staff of the department was small, being mainly concerned with the collection of Agricultural Statistics. In 1897 the Farmers' Institute movement was organized, but it was not until 1903 under the administration of the Hon. R. G. Tatlow, that a more progressive policy was evident.

In 1909-10 the Department was organized into the following three branches, Live Stock, Dairying and Farmers' Institutes, Fruit and Poultry, with a permanent staff of thirteen men. From that date the growth of the Department has been steady.

In the year 1916 the portfolios of Finance and Agriculture were separated, the agricultural industry being thus represented by a Cabinet Minister and the Department put on an equal basis with other Government departments.

For the purposes of administration the work of the Department is under the charge of a Deputy Minister with heads of branches who are directly responsible to him. At present the Minister of the Department is the Honourable E. D. Barrow; the Deputy Minister, Dr. David Warnock; and the Secretary Mr. W. J. Bonavia.

The office of the Deputy Minister takes charge of all work that is not directly handled by special branches of the Department. Linked with the Department are 159 Farmers' Institutes with 6,290 members, and 75 Women's Institutes with 2,753 members. Lectures and demonstrations are arranged and a considerable volume of routine work attended to in the shape of reports of meetings, list of members, etc.

Horticultural Branch, Provincial Horticulturist (vacant). This Branch maintains offices at seven centres of the fruit growing industry where instruction and demonstration are given in modern methods of pruning and cultivation, controlling insect pests and diseases, enforcing spraying regulations, conducting packing schools, and dealing with such other numerous problems as arise in relation to the fruit growing industry. The Branch has taken over a plot of six acres at Gordon Head to demonstrate the possibility of building up impoverished soil and dealing with other important questions. A section of orchard land has been put under codling moth control where various systems of control are demonstrated. The Branch maintains an effective system of nursery inspection.

Live Stock Branch.—Live Stock Branch Commissioner, W. D. McDonald. The activities of the Live Stock Branch are varied and include in addition to matters concerned directly with the live stock industry, the poultry industry, as well as soils and crops. A veterinary officer investigates plant poisoning,

carries out instructions with relation to the health of farm stock, more particularly with regard to the health of dairy herds. The Branch conducts the Provincial Egg-Laying Contest; Boys' and Girls' Competitions; administers the Egg Markets' Act; conducts Poultry Inspection and Instruction; Co-operative Sales of Live Stock; Co-operative Marketing of Wool; directs two Dry-farm Experimental Stations; demonstrates correct silo construction; inspects and records live stock brands; and under soil and crop work conducts experiments in tile drainage, manuring crop rotations, potato inspection, etc.

The Dairy Branch.—Dairy Commissioner, Henry Rivé. The Dairy Branch directs the work of six Cow Testing Associations; administers the Dairy Regulations Act; and operates two Government Creameries.

Branch for Inspection and Fumigation of Imported Fruit, Nursery Stock, etc.—The duty of this Branch is the inspection of horticultural and field products imported into British Columbia, and to other parts of the Dominion via British Columbia ports, for the purpose of preventing the entry of any injurious insect pests or diseases. Importations requiring such treatment are fumigated and if necessary destroyed or shipped out of the country.

Entomology and Plant Pathology Branch.—J.W. Eastham, Plant Pathologist. In this Branch investigations have been made into the Yellow Rust of Raspberries, Bacterial Blight of Walnuts, Western Tomato blight, and other diseases and experiments tried for their control. By an agreement with the Dominion Department of Agriculture the provincial laboratory at Vernon is under the direction of an official of the Dominion Entomological Branch. Here the life-history and control methods with respect to the onion maggot, cabbage-root maggot and other insects are investigated.

Statistics Branch.—The Statistics Branch co-operates with the Dominion Bureau of Statistics in the taking of a postal census every year. Additional data are secured through a crop correspondent monthly from July to December. This year a personal canvass has been made of the lower Fraser Valley to secure exact figures on small fruit acreage, etc.

Markets Branch.—The Markets Branch maintains a Commissioner for the Prairie Provinces at Calgary, and a Coast Markets Commissioner at Vancouver. The Markets Commissioner issues reports on the fruit consumption of prairie towns and obtains lists of retailers. The Eastern Canadian and United States points are also similarly covered. By a system of publicity the several consuming districts are kept informed

with regard to British Columbia fruits. The Vancouver Branch endeavours to stimulate the sale of British Columbia fruit in coast markets. This Branch also specializes in the inspection of fruit for export.

Apiary Inspection Branch.—Seasonal Bee inspection work is carried on under the supervision of the Foul Brood Bees Act of 1911, subsequently amended. Since 1914, four district inspectors have been employed giving instruction in up-to-date methods of bee keeping and combatting foul brood.

Publications Branch.—J. Roy McLennan, Editor and Chief. The Publications Branch distributes bulletins and circulars and edits and distributes the "Agricultural Journal," published monthly.

NOVA SCOTIA

A SUCCESSFUL COMMUNITY HALL

AN example of a successful community hall in which the whole community takes pride and interest is afforded by the so-called Agricultural Demonstration Building at Lawrencetown, N.S. It is claimed that nowhere in Canada will there be found a more flourishing hall of its kind or one that is better fitted for the purposes for which it is intended. The community hall as an institution which is strongly advocated by every authority on rural advancement, and particulars in regard to the hall in question, its history and its functions are narrated with the hope that elsewhere similar undertakings may be encouraged.

Lawrencetown is an attractive village of 600 inhabitants, situated in the midst of the Annapolis Valley, famed for its orchards and comfortable farm homes. Its interests are purely agricultural;

every resident is dependent on the farming industry, and is influenced directly by the prosperity of those engaged in farming.

In the summer of 1913 the people of Lawrencetown determined to have a community hall. To the continued efforts of Dr. J. B. Hall, a local resident, this decision may be chiefly attributed. Dr. Hall, formerly a member of the staff of the Provincial Normal College, now retired, has during his whole career been deeply interested in education and social advancement, and his initiative led to the development of public opinion in favour of a building suitable for educational and community purposes with which might be combined athletic grounds for the promotion of such sports as baseball, football, skating, etc. The decision reached led to a conference between the Secretary for Agriculture,

Dr. Cumming, and a number of leading residents, at which the County Farmers' Association was represented. A subscription list was opened up. The County Council made a contribution, and the Department of Agriculture provided, out of the Agricultural Instruction grant, sufficient funds to bring the total up to the sum of about \$4,000. This was enough at that time to provide for the purchase of land and erect a suitable building, but not to provide furnishings.

agriculture. Plans had not proceeded very far before it was found that owing to the prevailing lack of accommodation for such gatherings very little was likely to be accomplished. This led to the decision to offer some financial assistance to communities that would themselves contribute to the cost of providing a building suitable for such activities as short courses in agriculture and household science, Women's Institute gatherings, meetings of farmers' societies and associations, farmers' dinners, school



COMMUNITY HALL, LAWRENCETOWN, NOVA SCOTIA

The reason that led to the adoption of the policy of assisting communities to provide accommodation of this kind from Agricultural Instruction moneys will be understood when the situation that confronted agricultural extension work in the province is set forth. Following the granting of funds by the Dominion for expenditure by the provinces on agricultural instruction and education, the province of Nova Scotia arranged for a series of short courses in

fairs, public lectures, a public library and other activities of a similar nature. The result was that seven communities took advantage of the policy. The scheme of the Lawrencetown community and the associated farmers of Annapolis county was the only one that embraced any wide range of activities apart from short courses.

The building was opened by a short course in agriculture in February, 1914, which was attended by over 300 farmers.

The building is a one-story structure, the main features being an assembly hall seating 250 people, and an arena planned as a live-stock judging pavilion, but also adapted to any purpose for which an auditorium might be used, such as lectures, motion pictures and any other occasion for which the assembly hall did not afford sufficient accommodation.

The assembly hall is finished in hard-wood, and is furnished with platform, blackboards, an open fireplace, electric light, telephone, and stoves for cooking and heating. Two small apartments adjoining the hall are available for office and committee purposes. The additional furnishings necessary to complete the usefulness and attractiveness of the building were provided by the men and women interested. The money for the purchase of a piano was raised by social functions held by the women. Chairs, tables and other furnishings were also provided, many individuals making contributions. It is likely that in the near future a motion picture machine will be added to the equipment.

The library consists of about 1,000 volumes, the weekly issue being from

two to three hundred volumes. On the occasions when short courses were held, the arena was used for live stock judging and machinery demonstrations, while the assembly hall was used for seed judging classes, general lectures and household science demonstrations. On two occasions a county poultry show was held in the arena. In addition to this, the building is used for all public functions, and on such occasions the women of the community have usually provided refreshments.

The grounds adjoining the hall have also been made full use of for athletic games, a feature that is fully appreciated by the younger element.

Those responsible for the undertaking have in view an ever extending field of usefulness, but the development of these ideals is still in the future and will need time and persistent effort for their accomplishment. It may justly be claimed, however, that the results already achieved have more than justified every effort that has hitherto been made and augur well for future growth and development.

QUEBEC

HORSES IMPORTED FOR STOCK IMPROVEMENT

IN continuance of the policy of the Department of Agriculture of Quebec to assist in the improvement of the horse stock of the province, a further consignment of Percheron horses has been brought into the province for sale to individuals, agricultural societies, or breeding syndicates. The shipment consists of nine Percheron stallions, nine Percheron mares, one Belgian stallion and one Belgian mare. The horses range in age from two to five years. The valuation put upon the horses is set at from \$900 to \$2,500 for stallions and from \$500 to \$800 for mares. The horses were purchased in

the United States by representatives of the Federal and Provincial Departments of Agriculture.

SPECIAL GRANT FOR CLOVER HULLERS

To encourage the growing of clover and more especially for the production of seed in the province of Quebec, a special grant has been provided by the provincial Department of Agriculture for the use of agricultural societies, farmers' clubs, and other agricultural associations numbering at least twenty farmers to assist them in the purchase of clover hullers. The grant amounts to

10 per cent of the cost of machines purchased at from \$500 to \$1,000, and 15 per cent of the cost of machines costing more than \$1,000. The maximum grant to a society is fixed at \$200. This grant is available for machines purchased before the 1st of May, 1921, and applies only on the first huller bought in a parish.

THE PRODUCTION OF CLOVER FOR SEED

BY ARMAND LETOURNEAU, B.S.A., JOURNAL OF AGRICULTURE

Growing clover for seed has developed rapidly in the province of Quebec.

During 1919, 975,220 lbs. of clover seed were harvested in the province; the crop of 1920 will be still larger. The total for 1919 (975,220 lbs.) shows an increase of 644,992 lbs. over that of 1918. Had it not been for the very poor weather conditions of last fall, the yield would certainly have been over a million pounds. There are now hundreds of farmers who grow clover seed, not for sale, but for their own supply. A fact also worthy of record is that the quality of the seed is greatly improving.

Sixty-five new clover hullers were sold in our province during the year 1919. Most of these purchases were made by farmers' clubs or agricultural co-operative associations. A rebate of fifteen per cent of the purchase price was granted by the provincial department during 1919. The department having granted this year a special bonus of \$75 to the agricultural associations, twenty clover growing competitions were organized in which 424 competitors participated. The clover hullers placed free of charge at the disposal of the farmers in localities where clover was just beginning to be grown, have threshed, during the fall and the winter, 93,854 lbs. of clover seed. These machines stopped in 36

villages and clover was brought to them for threshing by 572 farmers.

COW TESTING

BY ALEX. DION, DAIRY DIVISION

Recognizing the advantages of cow testing, the Minister of Agriculture for the province of Quebec organized a whole month's campaign on this work last spring, in which all inspectors of butter and cheese factories and all county agronomists (agricultural representatives) of the department took part.

The seed scattered by these officials fell upon good soil, and over 30,000 cows were entered by the more progressive farmers of the province. Unfortunately, on account of the scarcity of bottles, acid and scales, resulting from the great demand for these articles, a large proportion of the orders could not be filled, and thus a great many were deprived of the advantage of making individual tests of their cows. All intend to purchase the necessary outfit next spring, however, and make a start in this work, so necessary for those who seriously desire to improve their herds.

In spite of this delay, there are actually 16,000 dairy cows under test in the province of Quebec, out of 24,000 entered in the whole of Canada; that is to say two-thirds out of the total number of cows under test in the Dominion in 1920 belong to the province of Quebec.

There is cause for congratulating our farmers who have once more shown what they can do, that they are never behind in progressive undertakings and never fail to join in all the campaigns launched in their interest by the Minister of Agriculture. Let those who have benefited from cow-testing this year continue to ascertain closely the yield of each of their cows, and before long they will reap greater profits not only through an

increase in the yield of milk, but also through better selection of breeding animals.

There is no doubt that those who have not as yet adopted cow testing will hasten to do so when they see

the results obtained by their neighbours and the profits derived from perseverance and intelligent work. Cow testing is the only way to get rid of the boarders—the cows that eat up the profit of a herd.

ONTARIO

NEW APICULTURAL BUILDING

THE new apicultural building at the Ontario Agricultural College was formally opened by the Hon. M. W. Doherty, Minister of Agriculture, at the time of the annual convention of the Ontario Beekeepers' Association.

The building is sixty-four feet six inches by forty-seven feet three inches.

on the inside with inch boards on the two by fours, two layers of insulating paper with a two-inch cork board, and finished with a quarter of an inch of Portland cement. There is a false ceiling six feet from the ground finished exactly the same as the other walls. The outlet at the top corner is



APICULTURAL BUILDING, AGRICULTURAL COLLEGE, GUELPH, ONTARIO

The basement comprises a honey and wax room with steam heat, water, gas, electricity, a dark room, stock room, bench room, lavatory, and a bee-cellar. The details of the bee-cellar are fourteen feet two inches by sixteen feet, walls eighteen inches thick, water-proofed on both sides, two by fours nailed on ends

connected with the ventilating shaft of the whole building and is controllable. A small inlet in the lower corner near the entrance is also controllable. The floor of the cellar is cement. An elevator in the corner of the basement runs up to the lecture room and also a bench room twenty-six feet by sixteen feet for

practical work in assembling supplies. Under the front stairs there is a natural fumigating room.

On the main floor in the front are a microscopic laboratory, small office, and a reading room, together with the general office, the apiarist's office, which includes a fire-proof vault for the keeping of records.

The top floor contains a lecture room to seat about two hundred and fifty, seats arranged in semi-circular rows rising at the back to five feet from the floor level. The lecture room will be complete with balopticon, enclosed blinds, sliding blackboard, desk, and observation colonies at the windows for use at class work.

The building is finished in tapestry brick and cost approximately \$60,000.

REPORT OF THE KEMPTVILLE AGRICULTURAL SCHOOL, 1920

BY W. J. BELL, B.S.A., PRINCIPAL

The School

The buildings, necessary to open the Kemptville Agricultural School to students desiring to avail themselves of the opportunity of securing practical instruction and training in agriculture, have been completed and also furnished with the most modern equipment available. Work was completed during the past summer on the Main School and the Farm Mechanics buildings. The Main School building is three stories, 120 feet by 61 feet and solid brick. It contains office accommodation for the staff, as well as class rooms and laboratories for instruction in agriculture and household science. The Mechanics building, 80 feet by 50 feet, is brick veneered, and is arranged for demonstration and practice on gas engines, tractors, farm machinery, blacksmithing, including horse-shoeing, carpentry and cement work. These two buildings, with the Live Stock pavilion, also containing the gymnasium, furnish excellent accommodation for conducting

a two-year course in agriculture, a course designed for young men and women who intend going back to the farm on completion of their studies.

The following instructors have already been appointed to the staff: L. G. Heimpel, B.S.A. (Farm Mechanics and Drainage); E. K. Hampson, B.S.A. (Field Husbandry and Science); and A. J. Logsdaile, B.S.A. (Horticulture, Entomology and Botany). As the course progresses other instructors will be added to the staff.

The school's regular course commenced October 25, with an attendance of twenty-two young farmers, an attendance which will be considerably increased when the winter term begins.

The following short courses were conducted at the school during the winter of 1920:—

Herdsmen's course, (five weeks); Farm Power (two weeks); and Household Science (four weeks). There was an aggregate attendance at the three courses of 358, and this would have been considerably increased but for an outbreak of small-pox and influenza during the progress of the Herdsmen's and Farm Power courses.

The Farm

A three-year rotation is employed on the farm, and this, coupled with thorough cultivation and a most favorable season, resulted in excellent yields of all field crops except roots. All cereals grown on the farm were from First Generation Registered Seed, which will be cleaned ready for the seeder and sold at reasonable rates to farmers of Eastern Ontario in quantities sufficient to seed five acres. The varieties of grains used were Banner oats, Arthur peas, O.A.C. No. 21 barley and Huron wheat. The ensilage corns grown were Golden Flow, White Cap Yellow Dent and Longfellow, the first-named variety giving the best results during the past season. Sweet clover was again used as the main pasture crop for dairy cattle and, as in 1919, gave excellent results. That

seeded in 1919 was pastured until June 25, 1920, and then left for seed. It was cut with a reaper with a minimum of shelling. Early pasturing prevented the plants from becoming unnecessarily tall and made them much more branching. Giant White Mangel has given excellent results on the School farm. A mixture of 8 pounds red clover, 4 pounds alfalfa, 4 pounds timothy and 2 pounds alsike per acre gave best results as a hay crop during the past year. Alfalfa sown 22 pounds to the acre has given good results, with practically no winter killing during the past two years. Ontario grown alfalfa seed was used exclusively.

A farm containing ninety acres was added to the two-hundred acre School farm last spring. A large house on this farm has been divided to make two comfortable houses for farm help.

Live Stock

Good results have been secured during the past year with the herds and flocks on the farm. The increase in young stock has been encouraging. Many of the Holstein and Ayrshire cows and heifers are making creditable and profitable official yields, while the health of all stock has been excellent.

ONTARIO CO-OPERATIVE MARKETING

United Farmers

Co-operative marketing has expanded rapidly in the province of Ontario under the direction of the United Farmers' Co-operative Company. Whereas the turnover of business in 1919 was \$8,500,000, the amount for 1920 approaches \$20,000,000. This amount of business includes the transactions at even co-operative stores. Expansion has been chiefly with poultry products and live stock. During the year the egg and poultry department marketed eggs and poultry to the value of \$600,-

000. The Toronto Creamery's turnover was \$380,000. These products were paid for on the basis of quality arrived at by thorough inspection methods. The live stock turn-over amounted to almost \$11,000,000 at the Union Stock Yards, Toronto, and about \$795,000 at the Montreal Stock Yards where branches have been established.

Brant County

In Brant the idea of co-operation and co-operative marketing has a firm hold on the people. As clubs are organized in practically very part of the county a great deal of the live stock is marketed that way. Although cattle and sheep are sold co-operatively to a large extent, pigs are more generally sold co-operatively. The Canadian Packing Company's plant being situated at Brantford, arrangements have been made whereby Toronto prices, less freight, are paid to all club members. Probably sixty per cent of all the pigs are sold in that way. The apples are sold either by a few groups of growers or by the Brant Fruit Growers' Association. Owing to the war the membership has dwindled down so that they will handle only about fifteen hundred barrels this season. The crop on a large number of good orchards has been purchased on the tree, owing to the scarcity of help.

Bruce County

The live stock industry in Bruce county is a most important feature of co-operation. Market stock goes out through co-operative channels from practically every station in the county. In many cases one man ships for four or five clubs and probably 60 per cent of all the cattle and hogs that are sent from Bruce are marketed through the co-operative shippers.

Lincoln County

During the past season the U. F. O. Co-operative Company arranged to handle the peach crop for the various clubs through an extensive advertising campaign and through the instrumentality of travelling salesmen. The season was exceedingly difficult from a beginner's point of view, owing to very heavy crops, the scarcity of cars, the difficulty of obtaining suitable containers and the sudden heat wave which brought all the Elbertas on at once throughout the entire peach belt. Notwithstanding these difficulties the organization made a creditable beginning which will enable them to carry on a more extensive business another year.

The Niagara Grape Growers, Ltd., with headquarters at St. Catharines, has been of untold value to the grape-growers of the entire grape-growing district. Their output up to the middle of October was about one hundred and fifty car-lots all of which have gone out of the country thus making the price at home far more steady and more remunerative. The standing of the organization is now of the best and will enable it to do far better next year. The proportion of the crop handled will run from sixty to seventy-five per cent.

Rainy River District

A group of farmers in the Rainy River District has received a charter for the Rainy River Co-operative Seed Growers' Company Ltd. This company was formed primarily for the purpose of installing a re-cleaning plant for the cleaning and grading of clover seed. The company contemplate, however, the handling of all classes of seed including grains and potatoes. The company is formed on a capital share basis. It will have an authorized capital of \$5,000 divided

into 200 shares of \$25 each. Shareholders are required to pay one-half of the amount of the subscription when purchasing the stock and the balance at the call of the directors.

Renfrew County

In this county we have organized a co-operative association for the marketing of farm crops and live stock and for purchasing for farmers' needs. The association will be known as the Renfrew County Co-operative Ltd. A charter has already been secured. The association will market eggs, poultry, and other produce, and will buy machinery and other farm requirements. The association is being financed by the promissory note system; notes given by members of \$50 each will be placed in the bank as collateral.

Dundas County

Co-operative marketing in Dundas is moving forward quite rapidly. The largest co-operative organization is the branch of the United Farmers' Co-operative Company, located at Morrisburg, which, before being taken over by the United Farmers' Co-operative Company, was known as the Dundas Co-operative Association. In connection with this association there is a cold storage, which has a capacity of 250,000 dozen of eggs and 3,000 cheese. The eggs and cheese are bought and paid for at the ruling prices and when sold the dividends which are over and above the price paid, come back to the producer, after deducting the selling expenses. This is the only branch in Greater Dundas which has cold storage facilities. Live stock, however, are shipped co-operatively from Aultsville, Wales, Finch, Chesterville and Mount-ain, as well as Morrisburg. Whether shipping is done weekly or every two weeks depends upon the quantity of

cattle and hogs available. These shipping points are branches of the U. F. O. clubs.

Eggs handled through the Morrisburg cold storage are gathered by truck from almost all parts of the county. These are called for twice weekly during the warm weather. In the cool weather when the egg production is falling off, gathering once a week is sufficient. Many of the eggs are exported to Great Britain.

The cheese marketed through the association is also handled on the profit sharing basis. Not all the factories, by any means, sell co-operatively. It remains optional with the salesmen and patrons whether they market through the co-operative organization or not.

Under able management co-operative marketing has developed steadily for several years, but with the improvement of roads, and consequently the greater use of motor trucks co-operative marketing has gone forward at a much more satisfactory rate. This is especially true during the year just closed.

Norfolk County

Two co-operative marketing associations are doing business in Norfolk county. These are the Norfolk Co-operative Association and the Norfolk Fruit Growers' Association. While these are separate associations they are managed by the same officer.

The Norfolk Co-operative Association serves about two hundred members as well as a large number of non-members by selling their produce, such as grain, potatoes and other vegetables, maple syrup, clover seed and lesser commodities. This society also purchases for its members supplies of such goods as mill feeds, corn, wire fencing, binder twine, salt, flour, sugar, fertilizers, etc. The largest amount of business is done in

mill feeds, potatoes and sugar. For example, about eight car-load of kiln dried corn were brought in. The first year of organization, 1918, the business transacted amounted to \$90,000; in 1919 it was \$141,000. It is expected that the turnover last year will exceed \$240,000.

The Norfolk Fruit Growers' Association in 1919 sold 16,000 barrels of apples for approximately \$90,000. In 1920 the business increased by about 9,000 barrels. The apple market situation is so difficult in 1920 that growers are unable to dispose of their stock unless through the association, even the canning factories closing down or running on short shift.

Notwithstanding the market difficulties the Norfolk Fruit Growers' Association have been able to sell practically the whole pack at fair prices. One of the great advantages secured by the association was the contracting ahead for barrels, by which a saving of from 50c. to \$1 per barrel was effected.

Oxford County

Considerable progress has been made in the marketing of live stock, eggs and poultry. Until 1920, very little live stock was shipped by the U.F.O. Clubs on a co-operative basis. That year, several of the clubs started shipping, with very satisfactory results. Not only were higher prices received, but those who had good stock to sell received the highest price, while those with inferior stuff had to be content with a lower market. Because of the fact that live stock has been sold on this graded basis, farmers can see the advantage of producing high grade stuff. Each of the clubs now shipping has found it exceedingly difficult to organize for co-operative shipping of live stock, but when once started has been keeping it up.

Farmers generally who have shipped their own live stock realize what they have lost by not taking more interest in the marketing of live stock in years gone by.

In connection with the poultry business, some of the largest egg circles in the province are now found in Oxford county. A large percentage of the eggs from the circles was sold to the United Farmers' Co-operative Co. at Toronto, and very few places in the province pay a higher price for eggs than is paid in this district. The organization of these egg circles is not only improving the quality of the eggs offered for sale, but is also stimulating both summer and winter production. People are naturally taking better care of their birds, and making the poultry a profitable part of the farm business. In this connection perhaps the most progress was made this year in systematically culling the farm flocks, with the idea of getting rid of boarders. An account of this culling work was described by Professor Graham in *The Agricultural Gazette* for October on page 817. It might be added to what Professor Graham said that, as a result of this work, several applications are on hand for the work to be taken up in three other districts. Even in the latter part of October some of the boys who helped in the culling work were still continuing to cull flocks at the request of farmers who have learned the advantage of having it done. It is therefore evident that a decided movement is on foot for a systematic improvement of the poultry of the county.

Victoria County

In the county of Victoria the majority of the hogs in particular are marketed co-operatively. No new shipping centres have been

organized during the past year but the organization in Mariposa township has made considerable advance. The continued opposition of the local drovers led to better organization on the part of the co-operators who have got their members to realize that the only way in which they can hope to succeed is to stick to co-operation even though prices may at times be lower than those offered by the drovers.

Through the Cambray Egg Circle large quantities of eggs, poultry and butter are shipped co-operatively.

Frontenac County

Nineteen United Farmers' Clubs are shipping hogs and cattle to market from Frontenac county. The Harrow-smith club is the largest shipper. This club ships an average of a carload of hogs a week, and has shipped about three carloads of cattle during the season. Other clubs have shipped smaller quantities. One of the clubs since August has been shipping eggs co-operatively. The eggs are selected on the case plan system of identification: that is, members bring their eggs to the collector who packs them in cases and ships them to Toronto or such other points as directed. The marketing is done through the Poultry Division of the United Farmers' Co-operative Company at Toronto. This company returns the checks for their eggs to the members.

POWER FARMING

BY W. C. BLACKWOOD, B.A., SC., PROFESSOR
OF PHYSICS

The Physics department of the Ontario Agricultural College, by correspondence with more than two hundred farmers who are using tractors, has ascertained facts relative to the comparative value of horse-power and other forms of power on the Ontario farm.

The statements are not based on information received where answers to questions differed respecting the relative merits of horse and tractor power, or where the efficiency of the tractor for any phase of farm work was questioned.

1. Most farmers agreed that horse-breeding was slightly on the decrease, but thought that other factors rather than the advent of the tractor were responsible for the decrease.

2. Tractors in large numbers have been used for so short a time that there has not been an opportunity of investigating the effect tractors will ultimately have on the number of horses on the farm.

3. The only horses that have been displaced are those kept for peak load during the spring months.

4. Total horses disposed of in 17 counties on 92 farms, from which returns were received, was 169, about 2 horses per tractor.

5. Many have not as yet disposed of their horses, as they are holding them for better prices. There will, therefore, in the near future be an

increase in the number of horses displaced by the tractor owners from whom information has been received.

6. As to economy, 54 out of 92 considered their tractor a profitable investment, 32 did not know, and 6 replied in the negative. The farmer in most cases had not kept strict enough account of the cost of each horse per year to be able to give a definite answer as to the economy of the tractor relative to the horse.

7. Improved work with the tractor seems to be a significant factor.

8. So far as the replacing of "horse" power by electrical power is concerned, there is as yet no available information which would lead one to believe that the influx of electrical power has had any marked effect on the horse problem on the farm.

9. Electrical systems are proving exceptionally efficient and are gaining in favour every day, according to reports received by the department. In electrical systems we include both hydro light and power, and gas electric systems.

MANITOBA

CONFERENCE OF AGRONOMISTS

A CONFERENCE of Manitoba Agronomists was held at the Manitoba Agricultural College on November 5 and 6, 1920. The purpose of the conference was to arrive at some definite conclusions as to the advice to be given to farmers in the different districts of the province in reference to crops, varieties, cultivation practices, rotations, etc.

The province was divided into three agronomic zones, i.e., Eastern, South-western and Northwestern. In each of these sections the agronomic problems were different but it was not possible

to definitely define these districts at the present time. The Eastern section or the Red River Valley was described as that portion occupying the basin of old glacial Lake Agassiz, and is approximately that portion of the province lying between the 96th and 98th meridians, and south of the 51st degree of latitude. The Southwestern and Northwestern sections are west of the 98th meridian, and separated approximately by the 50th degree of latitude.

It was agreed that this conference recommend the following varieties of grains, etc., in the order numbered.

THE AGRICULTURAL GAZETTE OF CANADA

those listed under No. 4 to be discouraged.

WHEAT	
<i>Eastern—</i>	
1. Marquis	4. Red Fife
2. Ruby	Red Bobs
3. Kitchener	Prelude
	Pioneer
<i>Southwestern—</i>	
1. Marquis	4. Ruby
2. Red Fife	Red Bobs
3. Kitchener	Prelude
	Pioneer
	Early Red Fife
<i>Northwestern—</i>	
1. Ruby	2. Kitchener
Marquis	Prelude
	Red Fife
	Pioneer

NOTE.—The recommending of Ruby and Marquis in No. 1 will depend on the particular location and danger from frost.

For all three districts where Durum is to be grown Kubanka is the variety recommended.

The following resolution was passed unanimously in reference to Durum wheat.—

"That this Conference recognizes that Durum wheat has greater resistance to rust and drouth than Marquis and that under certain conditions will outyield it. We would, however, point out that owing to its poor milling value, the market for it is very uncertain and that its effect on the export wheat trade with Great Britain might be prejudicial to the interests of Canada. We would, therefore, deprecate any great or sudden increase in the acreage devoted to this crop and would suggest that it be grown only where it is demonstrated that suitable red spring wheats cannot be profitably produced."

OATS

The oat varieties recommended for the different districts are:—

<i>Eastern—</i>	<i>Southwestern—</i>
1. Victory	1. Banner
2. Banner	2. Victory
<i>Northwestern—</i>	
1. Banner	4. Daubeney
2. Victory	5. Sixty Day
3. Gold Rain	

NOTE.—Our recommendations are based on knowledge of immediate conditions and quality of oats not based on tests.

In the Northwest District, Daubeney and Sixty Day are recommended only as early oats to be sown on late spring ploughing.

BARLEY

<i>Eastern—</i>	<i>Northwestern—</i>
1. O.A.C. 21	1. O.A.C. 21
2. Manchurian	2. Manchurian
<i>Southwestern—</i>	
1. Manchurian	3. Canadian
2. O.A.C. 21	Thorpe
	Two Rowed
	Variety, 1.
	Thorpe

NOTE.—As Manchurian and Mensury are practically the same variety, it was recommended that Mensury be dropped and only Manchurian carried.

RYE

North Dakota No. 959 is recommended as the best variety of rye for all districts.

FLAX

<i>Eastern—</i>	<i>Northwestern—</i>
Premost	Premost
N. Dak. R. No. 52	N. Dak. R. No. 52
N. Dak. R. No. 73	
<i>Southwestern—</i>	
Premost	
N. Dak. R. No. 52	

GRASSES.

<i>Eastern—</i>		<i>Pasture</i>
<i>Hay</i>		
1. Timothy		1. Brome
2. Western Rye		2. Meadow Fescue
3. Brome		3. Timothy
4. Meadow Fescue		4. Western Rye
(very promising)		
<i>Southwestern—</i>		
1. Western Rye or Brome	1. Brome	
2. Timothy	2. Western Rye	
	3. Timothy	
<i>Northwestern—</i>		
1. Timothy	1. Brome	
2. Western Rye	2. Meadow Fescue	
3. Brome	3. Timothy	
4. Meadow Fescue	4. Western Rye	

LEGUMES

<i>Eastern—</i>	2. Red Clover
1. Alfalfa	3. Sweet Clover
<i>Southwestern—</i> Sweet Clover or Alfalfa	
(depending on soil conditions).	

NOTE.—Where alfalfa cannot be grown it is recommended to sow Sweet Clover.

<i>Northwestern—</i>	3. Red Clover
1. Alfalfa	4. Alsike
2. Sweet Clover	

SUNFLOWERS

Where corn is not a success the growing of sunflowers is advocated. In the eastern district corn is a success—not an unqualified success but usually we get enough to fill the silos. Wheat does not do so well after sunflowers as after corn, but evidence goes to show that sunflowers can be grown as a succulent winter feed where corn cannot be grown.

ASSISTANCE TO FIRE SUFFERERS

IN August, fires occurred in a number of the newer settlements in Manitoba, mostly in those areas surrounding lakes Winnipeg and Manitoba. In these areas there is a mixture of timber land and prairie, alternating in some cases with moss-bottomed meadows which produce considerable quantities of wild hay.

For about three or four weeks the fires were burning continuously, the country at that time being very dry.

In order to have detailed information, the Department of Agriculture sent out ten special inspectors, who visited all the areas reported to be burned over, and collected a great deal of information as to the extent of the losses.

In several cases the settlers were returned soldiers. It was found that while the monetary loss was relatively not very great the amount of individual inconvenience was considerable, and the area swept over was

large. Much of the damage was done to pasture and to hay—both cut and uncut—and in some cases the settler found it difficult to care for his cattle; the fire had upset all his arrangements. In some instances, homes were destroyed.

After the returns were in, Mr. J. H. Evans, Deputy Minister of Agriculture, held a conference with the reeves and secretary-treasurers of the municipalities involved, and it was agreed that in all cases where the losers were situated in municipalities the assistance should be administered through the municipal offices, the Provincial Government assuming one-half the expense, and the municipality the other half. In unorganized territory the Provincial Government is assuming the whole expense and administering the assistance direct.

The general principle being followed is that the assistance is not being supplied in money form, but rather in the way of replacement of property destroyed.

SASKATCHEWAN

THE INTERPROVINCIAL WEED SPECIAL

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

ARRANGEMENTS have been made for operating a special train to be known as the Interprovincial Weed Special over the Canadian Pacific Railway main line and branches to the south in the three prairie provinces.

The purpose of the train is to compel the realization of the seriousness of the weed situation; to inspire the individual farmer to the greatest possible use of the remedies available; to bring about a united effort by all farmers; to secure the co-operation and completest effort

on the part of the municipalities in dealing justly with the farmers who refuse to recognize the seriousness of the weed problem, and of dealing promptly and fairly with owners of vacant lands which are weed infested. The movement is expected to initiate and develop a policy of maintaining in grass as much as possible of the road allowance.

The train will run for six weeks, commencing on the 24th of January; both morning and afternoon meetings will be held. The train will be made up of five cars, which will include two lecture cars, fitted with platform and

table, one exhibits car, one standard sleeper and one dining car. The exhibits car will include a display of growing weeds and such other material as may be regarded as suitable by a committee consisting of the chiefs of the weed branch in each of the three provinces. The staff accompanying the train will include one representative

from each province throughout the trip, a representative of the federal Department of Agriculture, with such assistants as are needed to carry out the programme that will be arranged. The train will be thoroughly advertised through the press and by conspicuous posters freely distributed throughout the territory to be covered.

· AGRICULTURAL INSTRUCTION NOTES

NOVA SCOTIA

PARTICULARS of rural science work in Nova Scotia during the active months of the late summer and fall are supplied by Mr. L. A. DeWolfe, Director, who reports as follows:—

The session of 1920 of the Summer School of Science was in many ways the best yet held in Truro. Each year marks a few steps in advance of the previous year.

The biggest contribution to our course in 1919 was the plays, games and sports. These are now recognized to be a necessary part of any school course. In 1920 the social side of school life was exemplified as never before, and the community centre idea became a reality rather than a theory. The Art Room of the Normal College was transformed into a combined Rest Room and Community Hall. Through the day, students who had free hours could read, write or rest. In the late afternoon, in-door games were taught. In the evening the whole school met here for a social two hours. This "Community Hall" did more than all other forces combined to create the very best school spirit we have ever had. The day's programme usually ended with one or two reels of moving pictures.

We proved to our satisfaction that one of the needs of young people everywhere was just such a social centre. Our students were not required to spend their evenings here; but, each evening found

ninety per cent of them present. Our own programme was more attractive to them than the town moving picture theatres. Hence the latter were not patronized.

Teachers who attended the course are better equipped as community leaders than any who have gone out from Truro on any previous occasion. The students themselves assert that with the science work, the games and social events, the outside lectures—which were excellent—it was the biggest four weeks of their lives. In that time the importance of their task as teachers has greatly expanded, but their growth has enabled them to keep up with it.

The enrolment was 108. Of this number, 19 were awarded diplomas; 46, one-year certificates; 7 were passed in physical drill only; 9 were graduates of former years; and 27 passed in less than four subjects.

School Fairs

This year there was a falling off in the number of schools exhibiting at the county fairs and in the older established centres. This, however, was offset by the number of local fairs in new districts. For the whole province, therefore, the number of school fairs was 153, in which 240 schools took part. A tendency is observed towards the local one-school fair, rather than towards the district fair. Two reasons are given for

this: one is the fact that parents fail to see their children's exhibits unless exhibited in the same section.

There is not likely to be much change in the number of fairs from year to year. Teachers govern such activities: and the number of trained teachers remains about the same. Older ones leave the profession as fast as a new supply is trained.

In addition to an annual change of teachers, another cause for a falling off of already established exhibition centres, is the fact that children tire of the same thing year after year. We have proved this by the added interest taken in such innovations as sports and contests. There is a danger, however, of turning the exhibition into a mere holiday of sports. That, too, would be fatal so far as educational value is concerned. We are striving, therefore, to make our prize lists as educational as possible; and at the same time to include enough sports to make the programme attractive.

Some of the travelling teachers of a year ago have now left the province. Five, however, have settled down in regular schools; but get \$150 a year supplementary salary for rural science and community work done outside of school hours or in other classrooms than their own.

We believe that more teachers are doing really substantial work than ever before. They are reaching the pupils through supervised play, school entertainments and library periods rather than through straight agriculture. Having won the children's sympathy in this way, agricultural instruction is tolerated in the same friendly spirit.

QUEBEC

The following items of interest in regard to Agricultural Instruction activities in the province of Quebec during the three months concluding with September have been gleaned from the reports submitted to the Dominion authorities for the period in question.

Agricultural Representatives

During the months of July, August and September, the Agricultural Representatives were busy preparing for their school and local fairs. As many as eight school fairs were held in some districts; the average per district being four. The fairs were very successful this year, judged by the number of entries and the quality and uniformity of the exhibits. At one fair 140 samples of potatoes of one variety were shown. The children and their parents took a great deal of interest in these school fairs, more even than in the county fairs. In fact, no better exhibits of vegetables were seen at the regular exhibitions. After judging the products, the judges give a lecture and supply useful information on the exhibits. This has resulted in an appreciable improvement of exhibits in places where such fairs have been held for several successive years.

A good deal of the time of the representatives was spent in visiting the competitors entered in the "stables" and in the vegetable growing contests. Thirty-one vegetable competitions were organized, with 683 entries.

Farmers' excursions were organized during the period, chiefly to the farm at Ste. Anne de la Pocatière. This institution was visited by the great majority of the farmers of the counties of L'Islet, Montmagny, Temiscouata and Rimouski. The farm was visited by groups under the direction of assistants, and lectures and demonstrations were given. The opinion expressed by many farmers who took part in these excursions was that they were exceedingly instructive and profitable.

Field Crop and Seed Competitions

The success of the movement for the production of better seed is proving highly gratifying to the officers of the department. Last year seed-growing centres were organized in various districts, and particularly in the districts

of Ste-Rosalie and Berthier. All the seed plots were carefully inspected this year by the provincial officer in charge of the work, accompanied by the secretary of the Canadian Seed Growers' Association. The Ste-Rosalie centre comprised 27 farmers, with an estimated output of 20,000 bushels of Banner oat seed.

The total number of standing crop competitions conducted was 161, with 3,809 entries, all of which were inspected and judged.

Proposed Seed Warehouse

During the summer a survey was made of the Lake St. John district by officers of the provincial department, with the assistance of the Dominion Cerealists, with a view of organizing the farmers for the growing and marketing of pure seed. The farmers of this district have always experienced great difficulty in procuring good seed of suitable varieties, and a solution of the question is urgently needed. As an outcome, the building of a warehouse was entrusted to the Ste-Rosalie Co-operative Association, with the understanding that the department will assist in the work of organizing.

Selection and Seed-growing Station Established

A station for the selection and multiplication of elite seed has been established at Ste-Rosalie within the last few months as a result of the efforts of the provincial department, assisted by the

Dominion officials, the Macdonald College, and the Ste-Rosalie Co-operative Association of Seed Growers. The product of this station will be propagated at the various seed-growing centres already established in the province. The Ste-Rosalie Association contributes 100 acres to the undertaking which will be in charge of the cerealists of the Macdonald College. Varieties tested at the Experimental Farms and on the college plots and proved suitable will be multiplied in this way and distributed throughout the province.

MANITOBA

During the fall months Women's Short Courses of five days' duration were held as follows:—

Dressmaking—

30 courses; enrolment 610;

Millinery—

18 “ “ 324;

In connection with Boys' and Girls' Club Work, three carloads of certified disease-free potatoes have been purchased for spring distribution.

The Creamery Inspector and Instructor visited forty-one creameries and addressed eleven meetings in the newer districts. He also graded several carloads of butter.

The Cheese Factory Inspector held fourteen meetings and visited thirty factories to assist the makers in turning out a better quality product. He also assisted in judging Boys' and Girls' Club fairs, paid visits to farms, and aided farmers in procuring pure-bred stock.

SHORT COURSE SCHOOLS

PRINCE EDWARD ISLAND

Since we have opened an Agricultural High School in Charlottetown we will have but one agricultural Short Course in the province. This will be held at the Agricultural High School, on January 4 to 14. Classes and demonstrations will be conducted in live stock, grain growing, poultry raising, motor mechanics and allied subjects. Lantern slides and motion picture reels will be used to illustrate the evening lectures. We anticipate having a large class of students, especially since many young men of this province are interested to-day in motor appliances for the farm, as well as other subjects of agricultural interest.—W. J. Reid, B.S.A., Director, Agricultural Instruction.

NEW BRUNSWICK

A ten days' short course in agriculture will be held in the Vocational School, Woodstock, commencing January 10. The Department of Agriculture, Fredericton, will supply most of the lecturing staff. Similar schools will likely be held at Moncton and Chatham under the direction of the Agricultural Representatives at those points.

QUEBEC

A series of short courses will be held at fourteen rural points in the province of Quebec during the winter months. The schools last from three to five days and include lectures and judging work with live stock, poultry and horticulture, and touch the more important and easily accessible points on the lines of the principal railways. The course will be in charge of the Agricultural Representatives who will be assisted by the officials of the Department of Agriculture.

Macdonald College

During the months of January and February short courses will be held at the Macdonald College in live stock, farm crops, horticulture, poultry and household science. The agricultural course will include judging, lectures and practice work in connection with live stock, field crops, grains, orchard and garden work, and the breeding, rearing, management and marketing of poultry.

The course in Household Science, which will extend over a period of about two weeks, will cover foods and cooking, home nursing, home furnishing, household accounts, household administration, laundering, millinery, nutrition, textiles and clothing, and dress-making. Each of the students in this course is given the privilege of electing one of the following subjects: Poultry, dairying, home gardening, millinery or cooking.

ONTARIO

At the Agricultural College

A useful series of farm short courses will be given at the Ontario Agricultural College during the winter months. Seven courses are provided. The stock and seed judging will occupy two weeks from January 11 to 22. The live stock judging will be carried on in the Judging Pavilion where specimens and groups of the various classes of horses, sheep, and swine will be used. In addition to the judging of animals, which will be carried on from 10.00 a.m. until noon, and from 1.30 to 4.00 p.m., each day, slaughter tests will be made. The fat cattle, sheep and hogs, after being judged on foot, will be slaughtered and again compared by the students under expert direction. At the close of the practical work each day, lectures will be

given on the breeding, feeding and management of live stock. Special attention will be given to the judging of horses, with the assistance of the stock kept at the college farm and animals supplied by neighbouring breeding farms. In seed judging, an hour and a half each morning will be spent in the study of the principal farm crops and of the most troublesome weeds in Ontario. Lectures will be given on purity and germination and on the cleaning, selecting, grading, and the improvement of seed.

Poultry Rearing

The poultry course will extend from January 11 to February 5, and will include instruction in the following branches of the poultry industry:—Location of poultry farms; situation, construction, ventilation, preparation of plans and estimates of poultry houses for various purposes; origin and characteristics of breeds and varieties of fowls; principles of breeding and mating; judging; hatching and rearing; feeds and feeding; marketing eggs and poultry.

Students' practice work will consist of feeding breeding stock; fattening; killing and dressing market poultry; operating incubators; candling and grading market eggs; and constructing poultry appliances.

Instruction will be given in the College laboratories on the anatomy of birds, poultry parasites and diseases of fowls.

In the carpenter shop, practical instruction will be given in the use of tools which are used in ordinary repairing and in the construction of coops, feed troughs, etc.

Every student is required to feed and care for a pen of birds; fatten, kill and dress a number of chickens, in addition to doing general work.

The Horticultural Course

The horticultural course extends from January 24 to March 4, and will include fruit growing, up to February 5; vegetable growing from February 7 to 9; and floriculture and landscape gardening from February 21 to March 4. The fruit growing course will include the fruit growing methods in Ontario which will cover the culture of trees and small fruits for amateurs and commercial growers.

The vegetable growing course will cover methods for both amateurs and commercial gardeners. In addition to the lectures, practical work will be given in seedage, cuttage, pricking out, potting, transplanting, etc.

The floriculture and landscape gardening will cover the growing of pot and decorative plants and cut flowers for the home and for market. The arrangement and planting of home gardens, school gardens, road sides and parks will be covered and instruction will be given in the choice, arrangement and planting of trees, shrubs, and vines. The practical work in this course will include propagation and planting as well as the drawing of landscape plans.

The Dairy Course

The Dairy Course continues from January 3 to March 18. The course for factory cheese and butter making is continued through this whole period. What is termed the Farm Dairy Course runs from January 24 to February 19; the Course in Cow Testing, from March 21 to March 31; ice cream making and soft cheese making, from March 21 to March 26. The course concludes with the Dairy Conference to be held on the 9th-10th-11th of March. In addition to the making of cheese, butter, ice cream, etc., instruction will be given in boilers, engines, piping, soldering as well as in the making of cheese boxes. Lessons in soft and fancy cheese making

will be given to the students of the factory class who wish them. The lecture course will cover live stock, breeding, feeding, health, cold storage, and other topics related to the industry.

At Country Points

In the province of Ontario, short courses in agriculture and home economics are held at one or more points in almost every county. The courses are of about four weeks' duration, commencing as a rule early in January. The courses are under the immediate charge of the agricultural representatives, who follow a general system outlined by the Department of Agriculture at Toronto, who assist in supplying speakers and demonstrators. The courses are made as practicable as possible, and are conducted in such a way as to meet the special conditions of the districts in which they are held. The agricultural and home economic short courses where practicable are conducted simultaneously. In sections where general farming is the rule, the topics covered are live stock, dairying, veterinary science, feeds and feeding, poultry, field crops, vegetable growing, soils and cultivation, fertilizers and manures, farm drainage, insects and plant diseases, weeds and weed seeds, bacteriology, farm power, co-operation and markets, farm management and book-keeping, business correspondence and journalism, and public speaking.

The home economics subjects are:—Food values and cooking, sewing, laundering, house planning and decoration, household administration, home nursing and first aid, child study and mothercraft, farm dairying, and such miscellaneous subjects as the storage of vegetables, culture of house-plants, books and reading, and such other topics as enter into home life. In both these courses demonstration by actual practice is utilized as far as practicable. The classes are held every weekday except Saturday, commencing at 9.30 in the

morning and concluding at four in the afternoon.

While the courses are in progress the students in agriculture organize themselves into Junior Farmers' Improvement Associations, and Home Economics Classes into Junior Women's Institutes. According to the experience of other years the forming of these organizations has the effect of holding the young people together for active organization work in the interests of better farming, and better home life. Following the usual custom in the province of Ontario the courses are held, as far as practicable, at points within the counties that have not been served by these courses in recent years.

The Kemptville School

A short course of three weeks' duration will be held at the Kemptville Agricultural School from January 31 to February 18. This course is designed to be of a practical and useful nature, and will combine general agriculture and farm power.

The following subjects will be dealt with:—

- Farm Engineering and Power;
- Feeding, Care, Management and Judging of Live Stock;
- Veterinary Science;
- Seed Judging;
- Manures and Fertilizers;
- Crop Rotations;
- Tillage and Cultivation;
- Farm Sprays;
- Insect Pests;
- Farm Planting;
- Farm Book-keeping and Management.

MANITOBA

A short course in farm engineering was held at the Manitoba Agricultural College from October 19 to December 24. A similar course will be held from January 10 to March 11, 1921. For this second course about one hundred and fifty applications have been received.

Eighty students only can be accommodated. These courses are intended, not only for the young men in the country, but for the more mature men on the farms. The subjects cover gas engine work, steam engines, boilers, forge shop, farm mechanics, concrete construction, building construction, farm machinery, and physics.

A course in live stock production will be held at the Manitoba Agricultural College from January 10 to February 5. The studies will include live stock judging, management and marketing; grain and forage production and grain marketing. In addition to the instruction and practice afforded at the college, the students will be given inspection trips to the Grain Inspection Department, the Grain Exchange, the Abattoir and Live Stock Yards.

SASKATCHEWAN

In addition to the three courses in gas engineering being held at the university this winter, one series of similar courses will be provided at outside points under the auspices of agricultural societies. Societies wishing to hold one of these courses must agree to provide:—

- (1) An enrolment of at least 25 students.
- (2) A well heated and lighted lecture room with ample seating capacity.
- (3) A heated building for a demonstration room, where tractors may be overhauled and operated.
- (4) Gas tractors and stationary engines. If possible one stationary engine for every 5 pupils and one tractor for every 10 pupils.

Two instructors are provided by the Extension Department. Each course is

of two weeks' duration, and the instruction given includes: Principles of the internal combustion engine; parts of the engine and their functions; cooling systems; ignition; carburetters; lubrication; timing and adjustments; care and operation of the engine, etc.

Five of these courses have been arranged commencing early in January and ending about the middle of March.

Agriculture and Household Science

Courses in Agriculture and Household Science will be held as usual this winter wherever requests for such are made. They are usually of two or three days' duration, and, wherever feasible, the courses for men and women are arranged for the same dates. Two instructors for the women and two for the men are usually sent out although often three for each are provided.

The instructors use charts for illustrating their lectures and it is hoped that this season they may also make use of lanterns and slides for giving illustrated lectures at the evening meetings. Forty of these courses were held last winter and it is expected that at least an equal number will be held during this winter. Three courses were held in December.—J. G. Rayner, B.S.A., Director of Agricultural Extension.

BRITISH COLUMBIA

Owing to the congestion of classrooms in the College of Agriculture, University of British Columbia, during the past two years, it has been found impracticable to hold short courses at the university during the winter months. Extension schools are, however, being offered at various points on the mainland and on Vancouver island.

SHORT COURSES IN RURAL ECONOMICS

TO BE HELD UNDER UNIVERSITY AUSPICES

Short courses in rural economics are arranged to be held at the Manitoba Agricultural College on January 17 to 28, and at the University of Toronto from February 7 to February 19. The Manitoba course will be conducted under the auspices of the Manitoba Agricultural College, the University of Manitoba, and the United Farmers of Manitoba. The Toronto course is being held in co-operation with the United Farmers of Ontario. These courses which are held for the first time under university auspices will be conducted with a view to developing personal equipment for the responsibilities which are being placed more and more upon workers in the rural communities. The topics presented are expected to appeal to those who look forward to intelligent and efficient citizenship, and to the rendering of a true citizen's service to the neighbourhood.

Professor W. T. Jackman, of Toronto University, will have charge of the

course at Winnipeg, and will take a prominent place in the course at Toronto. His lecture topics will include: Land, its acquirement and use; the economy of farm management; labour as related to agricultural production; capital and its importance in the operation of the farm; co-operation applied to marketing and other rural activities; rural credit, and other topics.

In the Winnipeg course Professor Jackman will be assisted by local instructors and leaders in the farmer's movement. In Toronto other prominent members of the university staff will deal with such topics as rural architecture, public health and hygiene, English literature, and Canadian History. At Winnipeg lectures will continue both morning and afternoon. At Toronto the lectures will all be given in the forenoons, and in the afternoons visits will be made to such places of interest as the Legislature, the Royal Ontario Museum, and the Stock Yards.

"The main single deficiency in rural life to-day is the lack of enough of the right kind of education. The general lack of scientific knowledge relating to farming and to the needs of rural home life, on the part of rural people, has long been a common observation. Conversely then, the main single remedy which must be applied to the rural life-problem is educational, and consists largely in a re-direction of rural education itself. By means of a re-directed education, we may hope to disseminate new knowledge relating to rural life needs and problems; to teach young people agricultural facts and fundamental principles, to awaken a deep love for the open country on the part of those born there, and a desire to live there; to develop better standards of taste for estimating pleasures and attractions outside the farm; to stir into action community forces which are now dormant; and to make of the rural school a strong and efficient social centre, working for the up-building of all the varied interests of a healthy rural life."—A. C. Gorham, M.Sc., in *Rural Education Monthly*.

PART III

Junior Agriculture

MANITOBA

EXTENSION SERVICE NOTES

Club Champions' Tour

The Manitoba Agricultural Extension News for December announces the proposal to undertake a sightseeing tour for one hundred Boys' and Girls' Club champions. The tour under consideration would include a visit to some of the more important agricultural colleges in Canada and the United States. Those taking the trip would be required to qualify through a competitive examination covering agricultural club and farm work. The cost of the trip for each member is set at approximately \$250. The members would be required to earn one-half of this amount, \$75 of which would be earned in a club project prize, and the remaining \$50 provided in other ways. The Extension Service expects to be able to secure the balance of the money required.

Baking Clubs

The Extension Service of the Manitoba Department of Agriculture has outlined a plan for the organization and work of baking clubs. A baking club may consist of two girls or more who are of club age, and who desire to take up the baking project. The club may meet in domestic science rooms or in private quarters where the necessary equipment can be obtained. The activities of the club include:—

- (a) Practical work in homes;
- (b) Regular meetings—talks, songs, games, demonstrations;

(c) Social meetings, tramps, followed by a bean supper;

(d) Charts of credits for all work done;

(e) Sale of work at end of three months.

The clubs are not expected to make every meeting a work meeting but are encouraged to hold social gatherings.

Boys' and Girls' Club Features

In addition to the regular work being carried on by the Boys' and Girls' Club of Manitoba, the members are expected to lay particular emphasis on special activities. Potato work will engage the special attention of club members in the Swan River Valley and the North Central part of the province. In these sections clubs will undertake the growing of certified Irish Cobbler potatoes. The Department of Agriculture, through the Extension Service, will supply a limited amount of high class seed which will be sold to clubs at cost.

Poultry Project

A number of clubs in the southern part of the province are specializing in poultry work. This project has been divided into (a) Chicken Rearing, and (b) Breeding Flock. The rules for the chicken contest are:—

1. Members agree to set at least two sittings of eggs;
2. Do all the work in connection with rearing the chickens;

3. Keep a record of all the cost of eggs, feed, labour, etc.

4. Exhibit some of the chickens at the fair.

In the breeding flock project, members must own and keep specified records from the beginning of the year to the first of June, of a flock of at least ten pure-bred pullets and one cockerel. Provision must be made for keeping these birds separate from other poultry. Eggs from this pen may be used for hatching and may be sold for a similar purpose. Fifty chicks is placed as the minimum to be hatched by a member before the middle of May. The chicks must all be marked with a toe-punch when they are two days old. Clubs must have at least five members all of whom must keep the same breed. The Department supplies application and expense forms for the use of the members.

Grain-growing Clubs

Grain Clubs are being organized at points where members have taken special

interest in growing seed grain of high quality. The rules and regulations governing the Grain Growing Club require that at least ten members, ranging from 13 to 19 years of age, shall constitute a club. Only registered seed may be used. The Department will provide the transportation charges on registered seed, which may be purchased with money borrowed from a local bank. From wheat, oats, and barley, members must grow from $2\frac{1}{2}$ to 5 acres; from corn, legumes and grass crops an acre will suffice. The members are required to take full charge of seeding, care of the plot, and harvesting. Provision should be made for competitions both for standing crop and threshed grain. The Department is preparing to pay 50 per cent of the prize money for these competitions. The local prizes awarded will be offered for grain exhibits from these plots at the Soils Products Exhibition in Winnipeg in the following January.

SASKATCHEWAN

FARM BOYS' CAMPS AND THE FOLLOW-UP PROGRAMME

By JOHN G. RAYNER, B.S.A., DIRECTOR
AGRICULTURAL EXTENSION

THE Saskatchewan Farm Boys' Camps, held at Regina and Saskatoon at the time of the 1920 summer exhibitions at those centres, were very successful. A total of 245 farm boys attended the Regina camp and 175 the camp at Saskatoon. The programme of the former camp consisted largely of stock judging competitions, and, at Saskatoon, in an endeavour to make the greatest use of the experimental plots at the university, grain and crop judging and identification contests were staged. In addition to these features there was the usual Y.M.C.A. programme of physical drill and recreation

as well as visits to points of interest in the cities.

Last season an entirely different agricultural programme was arranged at each point for the reason that the two camps are each part of a definite scheme and the boys are supposed to begin their camp attendance at Regina and complete the course by attending the Saskatoon camp the subsequent year.

The camp movement has been developed as a special "boys' work" feature for the agricultural societies. It is recognized that if the agricultural society is to continue to be successful it must claim the interest of the young people in some definite way. With this end in mind the camp movement was

extended in 1920 to include what is called the "Follow-up" programme. This programme is organized by the Extension Department of the Agricultural College and entitles any boy who has attended a camp to receive help in undertaking one of four projects, namely, pig raising, sheep raising, poultry raising and wheat growing. The pigs and sheep are purchased and bred and shipped to the applicants under the direction of the Live Stock Branch of the Department of Agriculture; the wheat is supplied through the office of the Field Crops Commissioner of the department, and the poultry is supplied by the poultry department of the College. The local agricultural society assists the boys in making financial and other arrangements in connection with their purchases.

The following applications have been received:—

	Applica- tions
Pig raising (one sow each)	30
Sheep raising (three ewes each)	22
Wheat raising (5 acres each)	17
Poultry raising (one pen each)	2

This follow-up programme is a constructive effort to interest farm boys in the production of only the best farm products. After the boys receive their contest material, an effort will be made to keep closely in touch with them in their work. Special prizes will be offered at the winter stock and poultry shows and the provincial seed fair for the exhibits.

As before stated, this programme enables the agricultural society to render a definite service to farm boys. The work differs from Boys' and Girls' club work in that it is considered to be more advanced. The boys must qualify by first attending one or more farm camps. Definite assistance is given in the securing of supplies, and the contest is considered to be definitely vocational. As with club work, there is involved ownership, responsibility, profit, competition with others, and other features which appeal strongly to normal boys. There has been a general demand for the extension of the camp idea to embrace some such programme as this and it is confidently expected that it will offer a popular service.

HOUSEHOLD SCIENCE IN TOWNS AND VILLAGES

BY MISS FANNIE A. TWISS, B.S., DIRECTOR OF HOUSEHOLD SCIENCE

THE Department of Education of the province of Saskatchewan is making an effort to interest the ratepayers of the towns and village schools in the teaching of household science by holding short courses of three weeks' duration. These are conducted by members of the extension staff of the Household Science Branch. The inspectors of schools are asked for suggestions as to the best localities in which to conduct the work. Places near together along the railway line are usually selected so that they may easily co-operate later on in getting a teacher.

During the previous year and a half, thirty-three places have been visited and

4,000 persons have received instruction. Those participating are the boys and girls in the lowest grade and the girls in the upper grades and the High School. Girls who have left school and are mothers' helpers at home, are encouraged to come. Pupils from the country, who are near enough to drive to the towns for the lessons, are made welcome. A few evenings during the course are devoted to meetings of the mothers, when discussions and demonstrations are carried on. At the close, a visiting day for parents and the school board is held. Refreshments are prepared and served by the class, and the work in sewing is exhibited.

The subject-matter of the lessons is very simple and practical. It includes the study of the best and quickest ways of preparing, cooking and serving the common foods, such as fruits, vegetables, cereals, etc., used every day in the home. Attention is paid to proper care of food supplies.

In the lessons in sewing, the use of patterns and the construction of simple garments is taught in the upper grades. Practice in hand and machine work is

The equipment furnished by the school board is quite simple and does not exceed \$50 in cost. Sufficient utensils are purchased for a class of twelve. The extra stoves needed and the sewing machines and dishes are loaned by the mothers. Ordinary tables and chairs are borrowed or trestle tables are made. A cupboard is furnished in which the equipment is stored when not in use.



SHORT COURSE IN HOUSEHOLD SCIENCE, HIGH SCHOOL, GAINSBOROUGH, SASK.

given. Patching, darning and simple hand sewing is taken in the lower grades. The little children in the lowest grade never fail to be delighted with the interesting fairy stories about food and health which are told them by the teacher conducting the course. The work in the lower grades is conducted in the presence of the class teacher so that she may continue it after the course is finished. Wherever needed the noon lunch is carried on and becomes a part of the school programme.

For many of the courses a vacant room in the school is used. Wherever the overcrowded condition of the school renders this impossible a room outside is procured. At the High School at Sintaluta, no room was available in the school house. Nearby was a little, old meeting house, now used as a hall. This was assigned to the class, and their first lesson with Miss Margaret McColl was one in housecleaning. They cleaned it thoroughly and transformed it into a home-like kitchen.

The finishing touch was given when they hemmed curtains for the small windows. At the close of the first day they were ready for the three weeks'

to see it carried on. This opens the way for the establishment of the itinerant teacher of Household Science. Where two or more schools jointly em-



SHORT COURSE IN HOUSEHOLD SCIENCE, CRAIK, SASK.

work, which they finished as enthusiastically as they had begun.

The short course gives the pupils a chance to try the work and the school boards and ratepayers an opportunity

to employ such a teacher, the Department of Education gives assistance to the extent of paying half the salary up to a maximum grant of \$750.

ALBERTA

WOMEN'S INSTITUTE BETTER RURAL SCHOOL MOVEMENT

BY MISS BESSIE C. MCDERMAND, ASSISTANT SUPERINTENDENT

AMONG the many activities of the Women's Institutes of Alberta perhaps none is more interesting and effective than the Better Rural School project which was first taken up systematically in 1918. In that year many delegates came to the provincial convention with problems concerning their rural school conditions. The result was

that the convention delegates courageously decided to abandon the traditions of conventions and not only moralize, discuss at length, and pass resolutions relative to proper school environment but to go home and do something.

When it is realized by thoughtful parents that the greater part of a child's day is spent at school, speculation on

the influence of the environment afforded by the usual rural school is not a pleasant pastime. In many schools the child is greeted in the morning by the identical clog of clay on the floor which he left the night before, thick dust everywhere, opaque windows, torn blinds and shabby walls. And educationalists tell us the impressions of childhood are of long duration! Unfortunately, too, many Albertan children, as is expected in a new country where immigration is encouraged, go to homes where there is a serious lack of comforts and health regard. The importance of creating good impressions at school is most obvious.

Plan of Attack

The Institute plan of attack was to first create local interest in the Better Rural School project. In dozens of communities Institute leadership was strong enough to enlist the personal interest and devotion not only of the members of the Institute but also of the majority of individuals in the district. The Institutes appointed educational committees to do similar work to that of Parents-Teachers' Associations. These committees reported the findings of local school investigations to the local Institute and with the co-operation of the Institute tried to meet the need.

This work of the Institutes is felt mainly along two lines—sanitation and hygiene and aesthetic culture.

Only the necessary preliminary moralizing was in the clouds, for the Better School project is being securely tacked to earth by such acts as taking the broom and wash-cloth in hand and scouring up the interior of the schools. It is surprising to find the number of cases where this is necessary. To follow up this line of attack the Institute members if they were unable to secure suitable

caretaking service made arrangements for it among themselves, and we hear that new kalsomine and paint makes its appearance yearly in many Institute-mothered schools.

The Hot School Lunch

In the sparsely settled districts of Alberta many children have to walk or ride four or five miles to school. Especially in cold weather the need of hot food is felt and accordingly dozens of Institutes, with the co-operation of the teacher, are serving hot school lunches. The Institute's part is to supply the equipment necessary and make arrangements for milk supply, sugar, seasonings, and staple foods. In many cases the Institutes have not only furnished equipment but have also built a kitchen on the school so that the children are privileged to sit down at a real table with the persuasion of the teacher's discipline.

Those who have attended a rural school remember the two cups (one for the girls and one for the boys) chained to the old pump. Much abused cups they were, sadly deteriorated in capacity and in appearance by the weathering of dust, knocks, grease, rust, lime deposit, and the general accumulation of years. The Institute school-mothers believe in a new order of things; sanitary cups and bubble fountains have found their way to many rural schools. Little services like this, and donations of pencil sharpeners, enamelled chalk, dainty white curtains, and flower pots cannot help but provide a means of stimulating in the child a regard for refined surroundings, health, and the worth of conveniences.

Realizing that the child's character is not formed by what is learned by rote, but rather by what he learns to love and admire, the school-mothers began to speculate as to the artistic value of the local grocer's

Christmas calendar as the only wall decoration. Now, the supplying of pictures—good prints of masterpieces—is one of the most popular features of the Better Rural School movement. The Institutes of two constituencies took this up last year and supplied each school in their constituency with two well framed pictures, and dozens of Institutes have followed their lead.

Music has not been forgotten; many Institutes have placed musical instruments in the schools. Last year several victrolas were purchased, as well as pianos and organs.

The Flag

In 1919, the Institutes of one constituency banded together and provided the means for the erection of flag poles for each school in the district. Dozens of organizations have provided flags both large and small for school use. This feature of the work has been particularly popular among Institutes situated near foreign settlements.

The first work in connection with the schools was taken up years ago when prizes for certain merits were given. In many cases this is still done and the present Women's Institute Scholarship fund may be a development of the feature. This scholarship is arranged by the Institutes of a constituency for the benefit of a girl in the district. The Department of Agriculture gives a five-day Home Economic course free to any class raised by the Scholarship Committee. A sufficient sum to cover one year's expenses at a provincial School of Agriculture is awarded to the girl with highest examination standing. This year

three scholarships have been given in the province.

Many donations of good books have been made to the schools. One rural Institute thirty miles from a railway line plans to buy \$100 worth of books each year. The books are to be used by the residents of the community as well as by the school children. Current event magazines have been placed in many schools this year through the generosity of the local Institutes.

Play Equipment

Even serious Institute school-mothers have not forgotten that there must be play, and many little tots are far more fortunate than their older brothers and sisters. Nice clean sand piles, swings, teeters, basket ball equipment, slides, etc., have made their appearance on many a country school ground; and in a few instances trees have been planted for the sake of their beauty and shade.

Many services too numerous to mention in detail have been thoughtfully planned and carried out by the school-mothers. Each new plan designed for the comfort, health, and welfare of the children has meant not only benefit for the children themselves but renewed interest in child welfare on the part of parents. The results so far seem to indicate that the children are taking their part in acting as teachers. Through the channel of the school many homes are being benefited by the influence of the better homes in the locality, thus attaining a more congenial social condition which so helps to develop the social virtues necessary to a happy community.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

THE PROTECTION OF MIGRATORY BIRDS IN CANADA

BY HOYES LLOYD, SUPERVISOR OF WILD LIFE PROTECTION

The Dominion Parks Branch, of the Department of the Interior, administers the Migratory Birds Convention Act in Canada. This Act, which is based upon a Treaty with the United States, protects three great groups of birds: The insectivorous birds, which are of such great value in protecting our crops from the ravages of insects, and which give so much joy to all by the exquisite notes of their songs, and the beauty of their plumage; the game birds, upon which we are dependent for wholesome recreation; and the non-game birds, including such families as the gulls and various sea-birds which are protected because of their aesthetic value.

This treaty furnishes us with the only means of protecting Canadian birds during their winter sojourn in the United States. By it both countries have agreed to extend absolute protection to all the important groups of insectivorous birds, as well as the nongame birds, and to grant similar open seasons to take those game birds for which open seasons are provided. These open seasons are of uniform length in the United States and Canada. An important feature of the Treaty relating to game birds is that all spring shooting of these birds is forbidden.

The Dominion Parks Branch, in administering this law, has endeavoured, primarily, to have all provincial laws amended, so that they would be in conformity with the Treaty; and once this has been done the Provinces concerned carry out the provisions of the Treaty when enforcing their own game laws.

In certain provinces the game laws differ in important respects from the terms of the Treaty, and in these provinces a full time warden service is maintained. In provinces where game and insectivorous bird laws conform with the treaty the activities of the Branch are largely educational in nature. However, the services of persons interested

in bird protection in all parts of Canada are utilized by having them appointed Honorary Game Officers. These officers have full power to enforce the Act, and there are now some hundred of them.

Many of the bird protection and natural history societies are assisting in the enforcement of the law by requesting certain of their members to apply for these positions.

Bird sanctuaries are being created in suitable places throughout Canada to protect the breeding grounds of water-fowl and other important bird localities. The protection of water-fowl in the great plains is most important. The water-fowl need the protection because of the increase in agriculture and the drainage of many of their former nesting areas. The great breeding ground for the ducks of North America is the southern half of the three prairie provinces, roughly coinciding with the area suitable for agriculture in those provinces. In addition to the government sanctuaries in those provinces each farmer should be encouraged to protect the water-fowl breeding on his own land. The breeding ground for these birds beyond the agricultural area is not illimitable as many seem to think.

In addition to lectures by members of the staff, knowledge of the Act and of the activities of the branch in administering it have been disseminated by means of posters and pamphlets. Copies of any of these pamphlets, which are still in print, may be obtained from the Commissioner of Dominion Parks, Department of the Interior, Ottawa.

The Migratory Birds Treaty offers the only possible solution of a vexed problem, that of the protection of our birds in the United States. It behoves us as Canadians to do our part in furthering the interests of this treaty, and then we can look with confidence and expectation to the United States to carry out its share of protection for the valuable birds of the continent.

THE RELATION OF BIRDS TO CROPS

BY MRS. RUBY R. MILLS, SEC., HAMILTON BIRD PROTECTION SOCIETY

Definite data are now available regarding the food habits of a large number of species of birds. During the past twenty-five years the biological section of state agricultural departments in all progressive countries has increased in value in its contributions to the advance of agricultural science by its pronouncements on the life histories of insects, birds and mammals in relation to man and his enterprises. The literature on the subject issued by the United States Bureau of Biological Survey in connection with the United States Department of Agriculture, is particularly voluminous and valuable, containing extensive surveys regarding the economic status of the crow, the European sparrow, the rat, and other vermin. Canadian research work in this field is highly creditable, however, every provincial department of agriculture now issuing farmers' bulletins from the pens of biological experts.

The more intensive the cultivation of the soil, the fuller must be our information regarding every factor contributing to the greater yield of food per acre or the falling off of the yield. The merest beginner in gardening faces the same problems as the extensive corn grower. The problems for instance of retaining nitrogen in the soil, of defending roots from insect pests and small vermin underground, of defending stalks and leaves and fruit from insect pests and vermin above ground, of protecting shrubs and plants from extreme weather by wind breaks, among other things.

The farmer need hardly be reminded that his operations have changed the face of the country. Settlement alters even climatic conditions. The felling of the trees, the filling-up of marsh lands, the diversion of streams, the pollution of rivers, have radically affected and modified the wild life of Canada as of other lands so treated. The extermination of the larger wild animals has permitted the undue increase of the smaller mammals. The "balance of nature" has been disturbed, and man has to exercise his wits to restore the balance by artificial means.

The cultivation of millions of acres of succulent plants has provided a new and never-ending food supply for the insect world. The more food man grows for himself, the more he provides for insects and small vermin. Probably never before in the history of the world has insect life been so abundant as now. At the same time that he has been increasing food for insects man has been hard at work for the past two centuries in America doing his best to exterminate the natural check on insect life, the

great order of birds. He has improved guns to slaughter insect enemies, trained dogs to pursue them, motor launches to track them to their quiet feeding places, decoys, traps, swift motor cars, automatic guns, every conceivable device for following and slaughtering the one and only order of beings provided by nature with the means of saving the food of the world. Ignorance, folly, madness, have been and are still, displayed to a greater degree by men in their treatment of birds than in any other direction of their activities.

* Sixty years ago millions of passenger pigeons traversed the continent twice annually, beautiful, harmless and tame. The short-sighted settlers slaughtered them coming and going until today not an individual remains. The wild turkey and the sage hen have met the same fate. Several species of sea and shore birds are near extinction. The cheerful, useful robins would ere this have been seriously reduced in number by being slaughtered in their southern roosts had not the Migratory Birds Convention of 1916 intervened to save the species. The Treaty between Great Britain and the United States to protect insectivorous birds, game birds and non-game birds was signed in Washington on August 16, 1916. Canada confirmed this by the Migratory Birds Convention Act in July, 1917, and the United States Supreme Court handed down judgment of the Treaty's constitutionality in April, 1920.

Over 300,000 insect species have been already classified and described. Entomologists believe that twice that number of species remain for description and classification. The number of species in this order of living things already named, far exceeds the number of the species of all other creatures on earth. And all other species, both vegetable and animal furnish food for these masters of creation. At every point man is confronted with the problem of controlling insect life. Enormous sums are expended in compounding poisons and applying them to fruit trees, grain crops and garden truck. The utmost labour cannot control the increase of insects.

The Grasshopper stands second on the list of the destroyers of crops. The alarm of an outbreak is cabled round the world. In 1920 the Canadian West was menaced, and heroic efforts were made by the state to kill the insects. They were seen by millions around Melita, Lyleton and Medora in Manitoba, and the despatch stated that "the only hope" was that the eggs would hatch early and the young hoppers be killed

by late frosts. Most species of birds devour grasshoppers with enjoyment. Here is a partial list of birds proved by their stomach-contents to eat this insect: Crow, Bob White, Jay, Meadowlark, Robin, Killdeer, Sandpiper, House Wren, Rock Wren, Kingbird, Catbird, Nighthawk, Veery, Wood Thrush, Brown Thrasher, Maryland Yellow Throat, Yellow Warbler, Chickadee, Vireos, Cedar Waxwing, Scarlet Tanager, Herring Gull, Plover, Hawks, Owls, Duck—the list could be extended to most species. Thirty grasshoppers were found in the crop of one Catbird. Prof. Aughey saw a pair of Long-billed Marsh Wrens carry 31 small locusts to their young in one hour. Prof. Beal found 60 grasshoppers in the stomach on one Nighthawk. Never, never, injure a Nighthawk! Its plaintive call over our cities is that of a friend. It might well be called "Mosquito Hawk." Insects are its only prey.

The Owls and Hawks are other species greatly misrepresented. The Owls may always be convicted of wrongdoing if guilty by the evidence of the nature of the pellets of undigested food regurgitated at their roosts. The slow flying Marsh Hawk, scouting over meadows should never be molested. It seeks the field mice and small rodents so destructive to roots and grain and seldom attacks birds. The villains of this family are the Goshawk, Cooper's Hawk, Pigeon Hawk and Sharp-shinned Hawk, which are swift of wing, tough and wiry of body, and good matches for a sportsman's skill.

No one should molest a little Screech Owl. It is protected by the laws of Ontario and is perhaps the most useful of its family. It lives on mice, grasshoppers, moths and beetles, though, driven by hunger, it attacks and kills small birds.

The relation of the Crow to agriculture has been exhaustively examined by the Biological Survey, Washington. Bulletin 621, by E. R. Kalmbach deals with this subject from every point of view. The writer assembles a large array of testimony for and against this cleverest of the bird kind. It is tempting to pursue it, but the time allotted to this paper does not permit of presenting anything but conclusions reached from examination of the stomachs of 118 crows. As this bird is omnivorous the contents covered flesh, fish, bird and vegetable food. Here is the verdict: "When feeding on injurious insects, crustaceans, rodents and carrion, and when dispersing seeds of beneficial plants, the crow is working wholly for the best interests of man; when destroying small reptiles, amphibians, wild birds, poultry, corn and some other crops, when molesting live stock and distributing their diseases, and when spreading seeds of noxious plants, it is an enemy of the farmer's

enemies; when destroying spiders and mollusks its work appears to have a neutral effect. The misdeeds of which the Crow has been convicted greatly outnumber its virtues, but these are not necessarily equal in importance. Much of its damage to crops and poultry can be prevented, while the bird's services in the control of insect pests can ill be spared. . . . A reasonable reduction of numbers of crows is justifiable in areas where there is an overabundance of the birds. . . . The verdict is a suspended sentence.

Plant lice are among the most difficult of insect enemies to control, because lice take food by suction. Here the small birds, wrens, warblers, kinglets, chickadees, etc., are of great value. It is a well-known and undisputed fact that some birds subsist through the winter on the eggs of plant lice. Edward Howe Forbush gives a list of 38 species of birds found by observation to feed on plant lice, including the injurious birch aphid. By the same painstaking methods 51 species have been proved to feed on hairy caterpillars.

The rapid digestion of birds—in from 20 to 60 minutes—the great quantities of animal food demanded by the rapid growth of their nestlings, and by the ceaseless activity of adult birds, makes their levies on the swarming legions of insects of utmost benefit to agriculture.

Prof. Bracken, addressing the Canadian Club, Regina, in March, 1920, said that Saskatchewan farmers lost \$25,000,000 a year by growing weeds. One hundred millions of dollars would be a conservative estimate of the loss of all Canadian farmers by growing weeds. Now, it has been proven, to a decimal, that the best-adapted agency for the destruction of weed seed is the bird. The bird charges nothing for its services but a few bites of fruit at the most. If provided with drinking dish or fountain and with shrubs and trees bearing wild fruits, even these small levies would be omitted.

In controlling weeds the Bob White is again to the front. Eighty-five varieties of weed seeds have been found in the crops of quails. One thousand rag-weed seeds have been counted in one crop; in another 1,000 crab grass seeds; in another 5,000 seeds of fox-tail grass, in still another crop 10,000 pig-weed seeds. Government Reports of Virginia and N. Carolina say that if there are four quail to each square mile of land in those states and the crop of each bird contains one-fourth of an ounce of weed seeds twice a day from Sept. 1—April 30, the total consumption of weed seeds by this number of quail would amount to 1,341 tons.

It is known by actual count in their stomachs how many seeds certain birds eat

at one meal, and by acutal count of seeds laid down and picked up by birds at feeding stations. A few data follow:

Snowflakes: 500-1,500 seeds of amaranth at one meal.

Mourning Doves: (1) 7,500 seeds of yellow weed.

Sorrel (2) 6,400 seeds of same weed, (3) 9,200 of same weed.

Tree Sparrow: 700 seeds pigeon-grass in one stomach.

Fox Sparrow: 1 ate 103 seeds Japanese millet in 2 m. 47 s.

Juncos: ate at same rate.

Song Sparrow: 34 seeds in 1 m. 10 s. and 154 in 3 m. 45 s.

If each bird took 30 seeds a minute on an average each day, the total in a winter would be reckoned in tons. Prof. Beal declares that Tree Sparrows—one of the prettiest of the species, too, consume 870 tons of weed seeds in one winter in the State of Iowa—a low estimate, he adds.

This great group of birds—the sparrows, belongs to the family Fringillidae which includes the finches, sparrows, grosbeaks, buntings, linnets and crossbills. About one-seventh of the birds of America belong to this family. All are seed-eaters, all insect-ivorous, all beneficial. This statement should be qualified by excepting the European Sparrow imported 50 years ago, which has multiplied beyond bounds. It is erroneously termed "English." The qualities of *Passer Domesticus* have been exhaustively examined both in Europe, Australia, New Zealand and America. Both there and here it is regarded as more or less of a pest. The testimony against it is overwhelming. Its services to the farmer are fewer than that of any species of its family.

We cannot realize with what an overwhelming wave of destruction would arise from insect hosts if for some reason the spring influx of bird life were to fail and its music remain silent.

THE HAMILTON BIRD PROTECTION SOCIETY

BY RUBY R. MILLS, SECRETARY

Early in 1919 two enthusiastic bird-lovers suggested that there should be an organization for the protection and study of birds in the city of Hamilton; and on this suggestion a committee was formed and a public meeting called. Over fifty members joined at this meeting; and a constitution was adopted in which it is set forth that the objects of the society are: "To extend hospitality to the wild birds; to protect them from their enemies; to acquire a greater knowledge of the bird-life of this vicinity, and to awaken a greater public interest in bird-protection and bird-study." As Honorary President, the society is fortunate in having Mr. Adam Brown, "the father of bird-protection in Canada," who, as member for Hamilton, introduced the first bird-protection legislation to the Dominion Parliament. The adult membership (paid up) is now over two hundred, and, except for a few small cash donations and a gift of printing from an enthusiastic member, the society has been financed entirely on membership fees. Though in existence scarcely a year and a half, the society feels justly proud of all that has been accomplished in so short a time.

In common with other societies having similar objects, the Hamilton Bird Protection Society feels that every child in Canada should be interested in our birds, and its work with junior members has been most encouraging. This has been demonstrated by the enrolment of 9,468 school children last winter and 6,200 already this fall in the city of Hamilton

and the two adjoining counties of Wentworth and Halton. The success of this work is due to the interest and co-operation of the inspectors, principals and teachers, who have formed "Junior Bird Clubs" in their classes and collected the small fees from the children. In return for the fee, each child receives a set of "Educational Leaflets," including coloured plates of birds and outline plates for them to colour. They also receive a membership button with a bird-picture in colours. This material is supplied by the National Association of Audubon Societies, and about half its cost is met from the funds of that association. Last year, a competition in building nesting-boxes was held in one school, at which officers of the society acted as judges; and this year it is hoped to hold a larger competition. With the growth of the society, there is room for its work among junior members to expand indefinitely.

The society has been granted the grounds surrounding one of the city reservoirs as a bird-sanctuary, which it has equipped with weather-vane feeding-shelters and a number of Saunders feeding-boards. Last spring, nesting-boxes were placed in the sanctuary and were collected by the birds. In addition to this sanctuary, many members of the Society have had good results in feeding the birds about their homes and in erecting nesting-boxes. The city of Hamilton, at the request of the society, has declared Wabasso Park, on the north shore of the harbour, ..

bird sanctuary and has equipped it with feeding-shelters and nesting-boxes. In this place it is interesting to note that the city erected nesting-boxes and put out food in a park in 1875; but then it was for the European house sparrows, at that time still so rare as to be thought desirable.

Hamilton has, on its western boundary, a wonderful area known as the Dundas marsh. It has been a perfect paradise for birds, especially for migratory water-fowl, and present observation shows that the amount of shooting due to the proximity of the city is reducing their numbers yearly. The society is now trying to have this area declared a bird sanctuary by the Dominion and provincial governments. The idea has been endorsed by Jack Miner, Mr. C. W. Nash, and other well-known ornithologists and bird protectionists; and, with the support that has been received from the Wentworth County Council and other local bodies, there is every prospect of this area being made safe for the birds.

Each season the society intends to hold a series of meetings, at which addresses on birds will be given to the members and their friends. Last winter six meetings were held,

all of which were open to the public, and all but one of which were free. These meetings were highly appreciated, and over five hundred people attended the first meeting of this season, when Mr. F. H. H. Williamson, Deputy Commissioner of Dominion Parks, spoke on "Sanctuaries," illustrating his address with motion pictures taken in the Dominion Parks. Other speakers this season will be: C. W. Nash, author of "Birds of Ontario in Relation to Agriculture"; Miss E. L. Marsh, of Peasmarsh Farm Bird Sanctuary, Thornbury, Ontario; W. E. Saunders, the well-known ornithologist, of London, Ontario; and (it is hoped) Jack Miner, whose wild goose sanctuary at Kingsville, Ontario, is such an example of what can be done for the birds.

What is being done in Hamilton should be done in every community throughout the Dominion. There are Bird Protection Societies in many places already; but there is a wide field still where there are no organizations, and this should be filled. If the brief experience of the Hamilton Bird Protection Society is of value to new societies which may be forming, it will be only too glad to hear from them and to offer them its advice.

THE McILWRAITH ORNITHOLOGICAL CLUB

BY C. G. WATSON, SECRETARY

The McIlwraith Ornithological Club of London, Ont., is slated to meet on the third Monday of each month, the July and August meetings usually being cancelled. The meetings are carried on in a friendly, free and easy style, with plenty of open discussion, and are usually featured by a talk by some member, or often an outsider, on something of interest to bird lovers. During the present year we have had some good addresses on bird-protection, attracting birds about the home, feeding birds in winter, etc. Some of our members have been very successful in attracting birds to their feeding devices and have enjoyed cardinals, downy and hairy woodpeckers, white-breasted and red-breasted nuthatches, chickadees, etc., in front of their windows all winter.

Our active field workers have had a splendid year and have made a list of 178 species of birds observed during 1920 in the vicinity of London.

Ten of our members have been sworn in as honorary game officers to assist in carrying out the provisions of the Migratory Birds Convention Act in this locality. The large number of boys and men that infest the outskirts of cities with revolvers, small rifles

and shotguns, and who shoot carelessly at any wild life, is a matter that should be dealt with by the government, and something done to put a stop to such practice. We feel that if a good stiff annual license fee was required of each before being allowed to carry such weapons at all, it would greatly lessen the dangerous nuisance. There is really nothing to hunt in many such infested areas.

We look forward to a profitable series of winter meetings, to which we always welcome students from any of the schools or universities, and indeed anyone interested in nature study. We especially encourage young people and we are glad to have them come without any fee, as our object is to increasingly widen the interest in bird protection, which is now recognized as so important in the best interests of the country.

We trust that more of the smaller centres will organize bird clubs, as we feel it is well worth while, both from the enjoyment such an interesting study affords, and the economic value to the agricultural community resulting from increased bird protection.

QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS

BY MRS. W. E. L. DYER, SECRETARY

During the summer lectures on bird life were given at the various summer camps for both boys and girls. These camps are mostly situated in the Laurentian mountains. Much interest was taken in these outdoor talks, and for the evenings or rainy days a lantern and beautifully coloured slides were provided. This work will go on during the winter as requests come to us for talks on birds in Y.M.C.A.'S, Y.W.C.A.'s, schools, and latterly from the Boy Scouts.

A movement is now under way to get the Scouts enlisted in the care of the bird boxes which the society has placed on Mount Royal and in the cemeteries. These sanctuaries, when established, need care, which the boys can give, cleaning and repairing the boxes after their summer occupancy, and, above all, creating in the boys that love for the birds themselves which is the main reason for all our work. A competition will be held for the boys caring for these boxes. Prizes will be given for the best essay on "How to Attract Birds," and "The Best Means for their Protection."

Last season hundreds of Montreal school children joined the society, signing the pledge and wearing the button. This year a circular letter is being sent out to all the schools of the city explaining to the principal the value to every child of a real love for birds and the consequent interest in their protection. To these junior members it is now definitely planned to give a free illustrated lecture annually by an ornithologist of note. Last year Mr. Herbert K. Job, of the National Association of Audubon Societies of the U.S.A., delivered this lecture in the

Imperial theatre in the month of March. The lecture for this year will be announced as soon as possible after the Christmas holidays.

It is planned also to give one or more lectures to the general public during the winter season. A nominal fee is charged for such lectures, as the expense of bringing a noteworthy lecturer to Montreal is a heavy drain on the small funds of the society.

For the adult membership of the society an interesting winter's programme is carried out. This programme consists of monthly meetings held on the second Monday evening in each month in the Windsor hotel. Addresses are given by prominent ornithologists. Some of the lectures are illustrated and discussion is always invited.

Every Saturday afternoon during the autumn season field walks are held to adjacent places of interest where birds can be best studied under competent leadership. With the earliest signs of spring these walks are again taken up.

The Society now has eight honorary game wardens, and all possible co-operation is given the Dominion Parks Branch in the enforcing of existing laws.

This society would be delighted to see organizations such as ours scattered throughout the province, either as separate societies or branches of this society. Our song and insectivorous birds need protection, need legislation and the enforcement of existing laws and this work is patriotic, economic and cultural.

MEETINGS OF ASSOCIATIONS

January 10-12, 1921. The annual meetings of the Manitoba Live Stock Breeders' Associations at Brandon. Secretary, W. I. Smale, exhibition offices, Arena, Brandon, Man.

January 13, 1921. The annual meeting of the Nova Scotia Poultry Association at Truro. Secretary, J. P. Landry, Agricultural College, Truro.

January 19 and 20. Dairymen's Association of Nova Scotia, eighth Annual Convention and Creamery Butter Exhibition; Bridgewater, Nova Scotia.

January 19, 20, 21, 1921.—The Annual meeting of the British Columbia Fruit Grower's Association at Nelson. Secretary, W. A. Middleton, Vancouver, B.C.

January 25, 1921. Saskatchewan Horse Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson, Regina, Sask.

January 26, 1921. Saskatchewan Cattle Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 26, 1921. General Meeting of Live Stock Organizations, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 27, 1921. Saskatchewan Sheep Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 28, 1921. Saskatchewan Swine Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

February 3. Ontario Vegetable Growers' Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 7, 1921. Ontario Berkshire Club, annual meeting. Secretary, R. W. Wade, Toronto, Ont.

Canadian Thoroughbred Horse Society, Annual Meeting. Secretary, T. J. Macabe, Toronto, Ont.

Canadian Swine Breeders' Association, annual meeting. R. W. Wade.

Canadian Pony Society, annual meeting. Secretary, G. de W. Green, Toronto, Ont.

Ontario Yorkshire Club, annual meeting. Secretary, R. W. Wade.

February 8, 1921. Ontario Swine Breeders' Association, annual meeting. Secretary, R. W. Wade.

Dominion Shorthorn Breeders' Association, annual meeting, Prince George, Sask. Secretary, Geo. H. Day, Guelph, Ont.

February 8, 1921. Canadian Sheep Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Trotting Association, annual meeting. Secretary, W. A. McCullough, Toronto, Ont.

Canadian Standard Bred Horse Society, annual meeting. Secretary, John W. Brant, Ottawa, Ont.

February 9, 1921. Ontario Ranchers' Association, annual meeting, Toronto. Secretary, C. M. Laidlaw.

Ontario Horse Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Jersey Cattle Club, annual meeting. Secretary, B. A. Bull, Brampton, Ont.

Ontario Sheep Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Hackney Horse Society, annual meeting. Secretary, H. M. Robinson, 883 Broadview Ave., Toronto, Ont.

Canadian Kennel Club, annual meeting. Secretary, J. E. Strachan, Toronto, Ont.

February 10, 1921. Canadian Shire Horse Association, annual meeting. Secretary, G. de W. Green.

Clydesdale Horse Association of Canada, annual meeting. Secretary, J. W. Wheaton, Toronto, Ont.

Canadian Brown Swiss Association, annual meeting. Secretary, Ralph H. Libby, Stanstead, Que.

Canadian Hereford Breeders' Association, annual meeting. Secretary, H. D. Smith, Ancaster, Ont.

February 8 and 9. Ontario Fairs and Exhibitions Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 10-11. Ontario Horticultural Association's Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 11, 1921. Ontario Cattle Breeders' Association, annual meeting. Secretary, R. W. Wade.

ASSOCIATIONS AND SOCIETIES

SILVER FOX EXHIBITION

An exhibition of silver foxes was held in Montreal on November 24, 25, and 26, under the auspices of the Wild Life Branch of the Commission of Conservation. The exhibition was organized and managed by Mr. F. C. Nunnick, Agriculturist of the Commission. The show was financially supported by the Dominion Department of Agriculture and the Governments of the provinces of Prince Edward Island, Quebec, Nova Scotia, New Brunswick and Ontario. The classification provided for four divisions: first, black and extra dark; second, dark silver; third, medium silver, and fourth, light and dark silver. These were further subdivided into sixteen classes according to colour and age. The entries numbered four hundred and eighty-five, but only about three hundred and sixty animals could be accommodated. The entries were chiefly from Prince Edward Island, but animals were also present from Nova Scotia, New Brunswick, Quebec, and a small number from the United States. The objects of the exhibition were to bring to the attention of the public the importance of the fox-farming industry, and to bring together breeders and ranchers for the development of the industry on sound, uniform lines.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

The annual meeting of the Pomological and Fruit Growing Society of the province of

Quebec, was held at Macdonald College early in December. Among the resolutions passed was one urging that the Minister of Agriculture extend the area of land attached to Macdonald College and devoted to horticulture, this extension being necessary to carry on breeding work in apples and other fruits.

The following officers were elected: President: J. H. Lavoie, Department of Agriculture, Quebec; Vice-President: H. J. Marshall, Abbotsford, Que.; Secy.-Treasurer: Peter Reid, Chateauguay Basin, Que.

QUEBEC LIVE STOCK ASSOCIATION SALE

The annual sale of pure-bred live stock held by the General Live Stock Association of the province of Quebec took place at Three Rivers in October. The sale included 222 head made up of 55 cattle, representing Canadians, Ayrshires and Holsteins; 177 sheep of the Leicester, Cotswold, Lincoln, Oxford, Shropshire and Hampshire breeds and 50 hogs of the Yorkshire, Chester and Tamworth breeds. All but six of the cattle were under two years of age. The average prices received were for Canadian cattle \$67, Ayrshires \$100, and Holsteins \$67.38. The average sheep prices were: Leicesters \$34, Cotswolds \$24, Lincolns \$17, Oxfords \$44, Shropshires \$35.50, Hampshires \$28.50. The swine sold for \$43.62 for Yorkshires, \$38 for Chesters, \$17 for Tamworths.

THE AGRICULTURAL GAZETTE OF CANADA

The association purchases the animals and sells them at auction without reserve. This year's sales left a deficit for the Department of Agriculture to meet. The purchasers included fifty-one individuals and forty-three associations.

THE CANADIAN CREAMERY ASSOCIATION OF ONTARIO

At the annual Convention of the Canadian Creamery Association held in Toronto on December 9 and 10, resolutions were passed urging the Provincial Government to have the creamery instructors and assistant butter graders, devote their winter months to inducing farmers in many localities to build ice-houses and cream cooling-tanks, and to hold meetings on these farms in hot weather to demonstrate the effectiveness of the ice-houses and cooling-tanks; approving the work of the National Dairy Council for the betterment of dairying conditions in Canada, and the methods of raising revenue adopted by that council; opposing further extension of the manufacture, sale or importation of oleomargarine into Canada; favouring a system of a Federal mark on all Canadian butter for export, on the grade certificate of the various province; requesting the Provincial Government to provide at Guelph and Kingston, an annual six days' course for operating buttermakers, conducted by a practical, scientific, outside man, approved by this association; approving the proposal to erect a suitable dairy building in connection with the Ontario Agricultural College, and urging the importance of the work being completed during the coming year; urging the Provincial Legislature to make operative the Dairy Standards Act, with such amendments as are in the best interests of dairying.

The following officers were elected: President, W. M. Waddell, Strathroy; First Vice-President: R. M. Player, Walkerton; Second Vice-President: G. A. Gillespie, Peterboro'; Sec.-Treas.: H. S. Johnston, Lindsay; Representative to National Council: Mack Robertson.

ONTARIO WOMEN'S INSTITUTES

The Women's Institutes of the province of Ontario have organized a system whereby the various major activities undertaken are dealt with by representative committees. The major activities include agriculture, home economics, immigration, education and better schools, and publicity.

Agriculture is covered under two headings, education and practical work directed under the convenorship of Mrs. R. G. Leggat, Newboro. In this division school boards will be encouraged to supply suitable grounds for school gardening and the proper training of teachers to direct the garden work.

Improvement of school grounds and recreation centres are also taken care of. Under practical work, women are encouraged to take up gardening, poultry raising, bee-keeping, etc., to create market centres for their products and to improve the surrounding of Canadian homes.

The home economics is under the direction of Miss U. M. Watson of Guelph. It is the duty of the home economics committee to recommend lines of work to be included in the demonstration lecture courses; to recommend suitable books for the study of women's institute workers, and through the Dominion federation committee, and to urge upon the Federal Department of Health the necessity of dealing with home economics and allied matters.

Miss D. M. Sutherland, Toronto, is convenor of the immigration committee. Their programme includes the keeping track of immigrant families that settle in the province through such Government agencies and bureaus as deal with this matter.

Education and better schools are in charge of Miss K. F. McIntosh, Home Demonstrator, Brampton, Ontario. The work to be undertaken will be done through home and school clubs and will work for the improvement of schools and more especially for the education of retarded and illiterate children and those that are without the English language.

The publicity programme is in charge of Miss Ethel Chapman of Toronto. It is the duty of this committee to supply institutes with material for demonstration lecture courses and other extension work.

THE INTERNATIONAL CROP IMPROVEMENT ASSOCIATION

A meeting of the International Crop Improvement Association was held in Chicago early in December. The International Crop Improvement Association is a federation of Crop Improvement Associations composed at present of several state associations of the United States, and the Canadian Seed Growers' Association of Canada. The purpose of this association is to promote closer relations between the crop improvement associations of various sections of the country, in order that we may have more uniform standards of inspection and types of grades of seed for distribution.

At the Chicago meeting a committee of six members was appointed to work out standard terms for various grades and kinds of inspected seed, so that terms such as "registered seed" and "certified seed," will have a common meaning in all parts of the United States and Canada. This committee will recommend a standard system of seed propagation, inspection and distribution by associations. The committee includes

the secretaries of The Wisconsin Alfalfa Growers' Association, The Michigan Crop Improvement Association, The North Dakota Alfalfa Growers' Association, The Idaho Seed Growers' Association, The Indiana Seed Growers' Association, and Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association.

The officers for the ensuing year were elected as follows:—President, G. H. Cutler, Professor of Field Husbandry in the University of Alberta; Vice-President: R. A. Moore, Madison, Wis.; Second Vice-President: B. F. Sheehan, Boisee, Idaho; Third Vice-President: A. L. Bibbins, East Lansing, Mich.; Secretary-Treasurer: J. W. Nicolson, Lansing, Mich.

CANADIAN SEED GROWERS' REGULATIONS

Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association, calls attention to the amendments made at the latest meeting of the association to the regulations covering the registration of seed. Previously no seed could be registered which was more than three years removed from elite stock seed. It is now permissible for any farmer to secure and show registered seed and have each succeeding generation registered without limit so long as he is able to maintain the purity and quality of the stock.

CANADIAN RED POLLED ASSOCIATION

The four western provinces were represented at the annual meeting of the Canadian Red Polled Association held recently at Calgary, when it was decided to adopt standards for qualification in the Record of Performance, so as to give the breeders an opportunity to have their cows officially tested for milk and butter fat under the supervision of the chief inspector for record of performance at Ottawa. This test will be available to breeders as soon as standards are approved by the federal department of agriculture.

The following officers were elected:—President: W. J. McComb, Beresford, Manitoba; Vice-President: J. H. Elliott, Irma, Alberta; Secretary: P. H. Hoffman, Amahein, Sask.

ENTOMOLOGICAL SOCIETY OF ONTARIO

At the annual meeting of the Entomological Society of Ontario, the following officers were elected for 1921:—President: Arthur Gibson, Dominion Entomologist, Ottawa; Vice-President: F. J. A. Morris, Peterboro; Secretary-Treasurer: A. W. Baker, O.A.C., Guelph; Curator and Librarian: G. F. Spencer, O.A.C., Guelph. Directors:—District No. 1, J. M. Swiane, Department of Agriculture, Ottawa; No. 2, P. E. Grant, Orillia; No. 3, Dr. A. Cousins, Toronto; No. 4, Dr. Watson, Port Hope; No. 5, J. W. Noble, Essex; No. 6, J. F. Henderson, Strathroy; No. 7, W. A. Ross, Vineland Station.

QUEBEC BEE-KEEPERS' ASSOCIATION

The annual meeting of the Quebec Beekeepers' Association was held in Montreal in November. The following officers were elected:—President: J. F. Prud'homme, Ste. Philomène, County of Chateauguay; Vice-President: J. O. Levac, Rigaud, County of Vaudreuil; Sec.-Treasurer: Armand Prud'homme, Ste. Philomène, County of Chateauguay.

THE CANADIAN SOCIETY FOR THE PROTECTION OF BIRDS

The annual meeting of the Canadian Society for the Protection of Birds was held in Toronto on December 18. The feature of the meeting was an address by Mr. Maughan, Director of Biology and Hon. Curator of the Provincial Museum, on phases of bird life, illustrated with black-board sketches and lantern slides. The following officers were elected:—President: D. A. Dunlap, Toronto; Vice-Presidents: Dr. J. N. E. Brown, and Charles S. Fraser; Provincial Vice-Presidents: Manitoba, D. H. M. Speechly, President of the Natural History Society; Saskatchewan: A. J. McCullough, Inspector of Public Schools; British Columbia: J. H. Scholfield, M.P.P.; Quebec: W. C. Hall, superintendent of the National Laurentide Park; Nova Scotia: Dr. A. H. Mackay, Superintendent of Education; Secretary: Miss Laura B. Durand, Toronto; Treasurer: E. Brook Daykin, Toronto.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Report of the Minister of Agriculture, Canada, for the year ending March 31, 1920.—The report comprises a summary of the operations of the different branches of the Department, including the Experimental Farms and Stations; also a list of agricultural enactments during the period. There is an appendix recording the transactions of the conference of representatives of Federal and Provincial Departments of Agriculture, held at Ottawa March 17-19, 1920.

The Canadian Record of Performance for Pure-Bred Dairy Cattle.—Report No. 12. This report, which is issued by the Branch of the Live Stock Commissioner, contains the Rules and Regulations governing the Record of Performance Tests; Standards for Registration; list of animals qualifying, and Index to Owners.

Studies in North American Cleorini (Geometridae), Bulletin No. 18 (Technical) by Dr. J. H. McDunnough, Division of Systematic Entomology. This bulletin, prepared for systematists is a scientific contribution resulting from studies of material in the National Collection of insects. It comprises 64 pages, including eleven plates of illustrations. These latter show genetical and other structural characters as well as the adults of a number of the species.

QUEBEC

The Province of Quebec and its Possibilities is the title of a volume issued by the Department of Agriculture, Quebec, which gives a general review of the natural resources of the province. The agricultural conditions and possibilities of the province occupy most of the book.

ONTARIO

Alfalfa.—Bulletin No. 280 of the Ontario Agricultural College, by Dr. C. A. Zavitz, Professor of Field Husbandry and Director of Field Experiments, covers the results of the experimental work done at the college with alfalfa, and outlines a satisfactory system of culture.

The Ontario Agricultural College.—The forty-fifth Annual Report of the Ontario Agricultural College and Experimental Farm 1919, reviews the history of the institution, describes the courses given, and the extension and experimental work carried on.

The Annual Report of the Corn Growers' Association, 1919, contains a list of the officers of the association, the financial statement, and a report of the annual meeting and show held in Chatham in January, 1920.

Report of the Minister of Agriculture.—The period covered in this report is for the year ending the 31st of October, 1919, and constitutes a review of the activities of the Ontario Agricultural College, and of the Provincial Department.

Horticultural Experiment Station.—This report for 1919 covers the new projects and such other major projects as are of interest to practical horticulturists. The more important work reviewed related to peach and strawberry breeding work; to greenhouse cucumber breeding; to apple pruning experiment; to tomato variety tests; to investigations with canning, and soil fertility experiments.

The Entomological Society.—The Fiftieth Annual Report of the Entomological Society of Ontario for 1919 deals principally with the report of the convention held at Ottawa that year.

Better Bulls.—Bulletin No. 281 of the Ontario Department of Agriculture has been prepared for the purpose of placing before the men who are raising cattle in the province of Ontario, facts in regard to the use of improved sires, and the work carried on by various agencies for the general improvement of live stock.

SASKATCHEWAN

The Report of the Live Stock Commissioner of Saskatchewan, for the year ending April 30, 1920, reviews the condition of the live stock industry, and covers the work done by the Branch in live stock distribution, stallion enrolment, and the work of the branch to control disease.

ALBERTA

The Department of Education.—The annual report of the Department of Education of Alberta for 1919 contains the Report of the Deputy Minister, the Supervisor of Schools, the Chief Inspector, the Assistant Deputy Minister, the Director of Technical Education, and the general educational statistics of the province.

BRITISH COLUMBIA

Pruning Fruit Trees.—Circular No. 60 of the Horticultural Series issued by the Department of Agriculture of British Columbia, deals with the pruning of young and mature fruit trees, and the treatment of neglected trees. The apple and pear and the stone fruits are discussed.

MISCELLANEOUS

Dominion Shorthorn Herd Book, Volume XXXVII, 1920.—Issued from the office of the Canadian National Live Stock Records, Ottawa. The volume contains pedigrees as follows:—Bulls, 136001-141700; cows, 156501-164800, together with a list of the officers and members of the Dominion Shorthorn Breeders' Association.

Dominion Shorthorn Herd Book, Volume XXXVI, 1919.—Issued from the office of the Canadian National Live Stock Records, Ottawa. The volume contains pedigrees as follows:—Bulls, 126250-136000; cows, 143360-156500, together with a list of the officers and members of the Dominion Shorthorn Breeders' Association.

Canadian Hereford Herd Book.—Volume II of the Canadian Hereford Herd Book has just been issued from the office of the Canadian National Live Stock Records, Ottawa. It contains pedigrees 33,605 to 38,233 inclusive. Also a report of the annual meeting held February 5, 1920, a copy of the constitution and by-laws as amended February, 1917, and a list of members of the Canadian Hereford Breeders' Association, publishers of the Herd Book.

Western Canada Live Stock Union.—The proceedings of the seventh annual convention of the Western Canada Live Stock Union are recorded in the report for 1919, which covers the meeting of the union held in British Columbia in November, 1919. The Secretary of the Union is E. L. Reicharson, Calgary, Alta.

"*The Manitoba Agricultural Extension News*" is the title of a new monthly publication of the Manitoba Department of Agriculture and Immigration, the first issue of which appeared in November. As the name implies, the publication will constitute a news service for such activities as Boys' and Girls' Clubs, Seed Fairs and other projects carried on under the auspices of the Extension Branch of the Department.

"*World Agriculture.*"—This quarterly journal, which forms a recent addition to the list of agricultural publications, will print official news of the "World Agricultural Society," and of the following organizations among others:—

The International Institute of Agriculture;
The A.E.F. Farmers' Club;
The American Country Life Association;
The Beaune Committee of World Co-operation on Agriculture and Country Life;
La Société des Agriculteurs de France;

The International Association of Agricultural Missions.

The World Agricultural Society is a fellowship of individuals and organizations interested in the world aspects of agriculture and country life. Its fundamental aim is the promotion of a better understanding in matters connected with production, distribution and consumption of agricultural products.

The Society is an outgrowth of the Conference on World Agriculture held at the A.E.F. University, Beaune, France, in June, 1919. It welcomes individuals and organizations who desire to join. Subscription rates are \$3 per annum to non-members and \$2 to members. Enrolments and subscriptions should be sent to the Secretary, World Agriculture Publication Committee, Amherst, Mass., U.S.A.

The Canadian Society of Technical Agriculturists: There has been published a report of addresses and discussions at the organizing convention of the Society held in Ottawa in June, 1920. The report is edited by the secretary of the Society, Mr. Fred H. Grindley, Gardenvale, Que.

NEW BRUNSWICK

Department of Agriculture: The annual report of the Department of Agriculture of New Brunswick for the year ending October 31, 1919, gives an account of the work accomplished by the department by branches and divisions.

NOTES

At the International Exposition held in Chicago in November, 1920, Canada won twenty-one out of twenty-five prizes in wheat and oats.

¶ Rev. Charles J. S. Bethune, M.A., who for fifteen years has been Professor of Entomology at the Ontario Agricultural College has resigned. Dr. Bethune has retired to private life.

In the province of Manitoba more than one hundred consolidated schools are in operation. The largest of the consolidated schools, situated at Dauphin, is a fully graded school with twenty teachers.

The Agricultural Representative for Megantic County, Quebec, reports that the clover seed growing industry, which was commenced in 1916, last year produced twenty thousand pounds of seed.

In the province of Manitoba two hundred and twenty-nine school fairs were held in 1920. The number of children exhibiting are estimated to have been about twenty-one thousand.

G. S. Johnson, who for the past five years has been principal of the Whitby High School, has left to assume the principalship of the Northern Academy at Monteith, in New Ontario.

In Wellington county, Ontario, a Farmers' Club has purchased a potato cellar as well as a building for meetings and office work, while another club in the county has obtained a suitable building for a warehouse and store.

Canadian Farm Products, Ltd., Prince Edward Island, last spring distributed seventeen thousand chicks from its local hatchery at Charlottetown, from eggs produced by government inspected pure bred flocks.

Mr. Harvey Mitchell, of Keswick, N.B., former dairy inspector for the Federal Government, has been appointed Deputy Minister of Agriculture for the province of New Brunswick in succession to E. P. Bradt.

In Brant county, Ontario, a five acre plot has been selected for reforestation, in accordance with the policy recently announced by the Minister of Agriculture. The land, which is a very light sand, is situated on the main-travelled road.

The formal opening of the Kemptville Agricultural School will take place on February 18. The Hon. M. W. Doherty, Minister of Agriculture for Ontario, and the Honourable S. F. Tolmie representing the Dominion Department will be present.

A dairy club has been organized amongst the students of the Ontario Agricultural College. The purposes of the club are similar to those of the existing animal husbandry, horticulture, apiculture, poultry and biology clubs.

Honourable J. E. Caron, Minister of Agriculture for the Province of Quebec, recently made the announcement, that a measure would be brought down at the next session of the Legislature to make it obligatory to pay for milk according to the quantity of fat contained therein.

The Lambton county, Ontario, Beekeepers' Association is inaugurating a movement to stamp out foul brood in bees. They purpose employing an inspector to locate and destroy diseased colonies. A fund of \$1,000 is being raised locally to assist in carrying out this work.

The Alberta Department of Agriculture has succeeded in securing a Percheron stallion of superior quality for the use of horse breeders in the province. The animal purchased is "Job," bred in France, and for a number of years at the head of the breeding farm of Mr. Dunhams, Wayne, Ill. "Job" is eleven years old and has a most successful breeding record. The price paid was \$8,000.

The Agricultural representative for Brant county, Ontario, has appointed an advisory council with respect to work in the county. Five township live stock conventions are to be held during the winter. The advisory council will assist in securing the necessary live stock for demonstration purposes. Four farm power courses are also to be held, as well as a sheep and swine course.

Two appointments have recently been made by the New Brunswick Department of Agriculture. Mr. George Thimens has been promoted from Assistant Dairy Superintendent to Dairy Superintendent, succeeding Mr. H. W. Coleman, resigned. Mr. J. H. King, Agricultural Representative at Moncton, has been promoted to the office of Live Stock Superintendent, in the Department of Agriculture at Fredericton.

The Honourable D. W. Mersereau, M.L.A., has been appointed Minister of Agriculture for the province of New Brunswick, succeeding the Honourable Mr. Tweeddale. Mr. Mersereau was for many years prominent in municipal politics, representing the parish of Gladstone in the county of Sunbury as county councillor. He owns and operates a farm at Fredericton Junction. Mr. Mersereau has been chairman of the agricultural committee of the Legislature.

A class of students representing the University of British Columbia, in charge of Professor Clement, competed in stock judging at the Pacific International Exposition at Portland, Oregon. The British Columbia class won second prize against Oregon which won first, Washington which won third, and Idaho fourth. The British Columbia team won first in judging Jerseys, second in judging Holsteins, and third in judging Guernseys.

Macdonald College has instituted a new department of Botany which will give special training to agricultural students desirous of specializing in plant pathology. This new departure is designed to meet the demand for specialists in plant diseases to cope with the problem of farmers, fruit and vegetable growers, and florists, and to endeavour to prevent the heavy losses that are suffered every year from the ravages of plant diseases.

This year's enrolment at the Nova Scotia Agricultural College is eighty-nine regular students and nine special soldier students. The eighty-nine regularly enrolled students come from the following provinces and countries:—Nova Scotia, forty-four; New Brunswick, thirty; Prince Edward Island, seven; Newfoundland, five; England, three. Approximately half the students come from the province of Nova Scotia and the greater part of the other half from the two provinces of New Brunswick and Prince Edward Island.

A number of changes have occurred in the staff of the Macdonald College: Miss A. E. Hill, head of the School of Household Science, is succeeded by Miss Bessie M. Philip. Miss Philip is succeeded, as instructor in cooking, by Miss M. M. Chute, formerly superintendent of Women's Institute for Quebec. Dr. Gordon M. McRostie, a graduate of the Ontario Agricultural College and of Cornell University, has joined the staff of the Cereal Husbandry Department. Mr. M. A. Jull, head of the Poultry Department, is taking a post-graduate course at the University of Wisconsin. He is succeeded in the meantime by Mr. W. A. Maw, a graduate of 1920. Mr. L. H. Hamilton, a graduate of the Ontario Agricultural College, has been placed in charge of the extension work in Animal Husbandry. Mr. S. R. M. Hodgins, a 1920 graduate, is the editor of the *Journal of Agriculture* and lecturer in journalism at the College.

THE AGRICULTURAL PRESS

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The Embargo and the Cattle Industry. H. S. Arkell, M.A., B.S.A., Live Stock Commissioner, Ottawa, page 1595.

Canadian Record of Performance Work. C. S. Wood, page 1598.

The development of the co-operative spirit and all that it stands for, and the creation of a rural civilization—these things are among the greatest needs of our time, says J. Nugent Harris, late General Secretary to the Agricultural Organization Society of England and Wales. He continues:—

To use the illustration of the brilliant editor of the *Irish Homestead*—"Let a fisherman trawl the seas with one loop of cord and it may be ages before he secures a fish, but let him unite a thousand loops of cord in a net and trail the seas and he will draw it in shining with herring or mackerel. Man has to learn the same lesson, he points out, about the forces of nature. They will not yield to the individual. He cannot draw them down though they are all about him. But let him unite with a thousand others and he can build ocean liners, and make the cathedral spire rise to heaven. He can, if he will, gather the harvest of the powers which have waited for such unity to yield themselves to man from the beginning of the world."

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to
T. K. Doherty, International Institute Commissioner, Department of
Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

International Year Book of Agricultural Legislation, 1919.—1,130 pages. (Text in French only, with an analytical introduction and index in English). *International Institute of Agriculture*, Rome, Italy, 1920.

The International Institute of Agriculture has just published the customary Year Book of Agricultural Legislation for 1919, containing information which is of very considerable interest inasmuch as it gives an account of the measures adopted in many different countries for coping with problems of the transition period from a state of war to one of peace.

The world legislation of 1919, if studied in its broader aspects, must be completely differentiated from that of the period immediately preceding. During war time the great bulk of enactments were essentially transitory in their nature, intended to ensure for the benefit of the populations the effective use of the supplies coming to hand. These enactments took in most cases the form of State intervention to prevent absolutely any exportation of domestic produce and to fix, by means of Government action, maximum prices for essential articles of consumption.

But in 1919 Parliaments and Governments were confronted by problems of wider significance. The most serious question was that of agricultural reform, which was dealt with, notably in newly founded States, by measures of far reaching character. The question had to be settled in duplex fashion in order on the one hand to stimulate production and on the other to put an end to the age-long disputes between peasant and landowner. We may instance, in this connection, enactments in Germany, Denmark, Estonia, Great Britain and Ireland, Poland, Roumania, Serbia and Czechoslovakia.

The high prices of essential articles are the subject of sundry measures sanctioned during 1919; among such were the Profiteering Act in Great Britain, the Spanish law against undue holding, the Victorian enactment against exorbitant profits, the two Canadian measures as to trading commissions and undue holding of stocks. But any of these measures may be favourably contrasted with the war time provisions, indicating as they do a widening conception of the points at issue, with some endeavour to ascertain the causes of the irregularities, and to attack these causes at the fountain head, instead of attempting to deal merely with their results.

The consideration of Parliaments and of Governments in several countries was also required in 1919 for the official organization of agricultural associations. These local bodies serve to represent the farming interests in their respective localities and to communicate their opinions to the central administration. Notable instances of such measures occurred in France and the French Colonies, in Spain, in Greece, in Tripoli and Cyrenaica.

The important question of popular insurance also absorbed much attention in the various legislatures during 1919. Spain has initiated a system of workmen's old age pensions; Italy has made it obligatory to ensure against disability, old age and unavoidable unemployment. Portugal has sanctioned obligatory insurance against sickness, labour risks, disability and old age, and has founded a Popular Insurance Institute for carrying these objects into effect.

In conclusion, the delicate and complex subject of relations between labour and capital occupied much space in the records of legislation during 1919. The subject is complicated by the divergent forms which such relations may assume when legally interpreted, and by the varying effects resulting from State intervention; its delicate

nature, particularly at the present time, arises from the conflicting interests so immensely difficult to reconcile. We confine ourselves to the mention of the French and English legislation as to defective agricultural agreements, of the French law as to collective labour bargains, of the Spanish and Portuguese enactments as to labour exchanges, of the Greek provisions as to house accommodation for leaseholders, and of the Italian decrees setting up commissions for dealing with the controversies arising from the conditions of agricultural work.

The Year Book may be obtained from the Secretary-General, International Institute of Agriculture, Rome, Italy, for 15 francs.

Mr. T. K. Doherty, delegate of Canada at the General Assembly of the International Institute of Agriculture, held at Rome on November 3rd to 10th last, suggested that the whole of this Year Book be translated into English instead of merely the introduction as at present. This suggestion was favourably received, especially by the English speaking delegates, and it is quite possible that in the course of next year, translations will be prepared and made available for both the 1919 and the 1920 editions. It is possible that the 1920 edition will be translated and distributed in sections, pending completion of the full volume.

810.—**Digestibility of Protein Supplied by Soy-Bean and Peanut Press-Cake Flours; Experiments in the United States.**—HOLMES, A. D., in *U. S. Dept. Agr. Bulletin*, No. 717, p. 28, Bibliography of 22 publications. Washington, September 25, 1918.

The writer considers that soy-bean and peanut flours, being rich in proteins that are very digestible and of high biological value, should prove valuable additions to the human dietary.

CROPS AND CULTIVATION

815.—**A Field Study of the Influence of Organic Matter Upon the Water-Holding Capacity of a Silt-Loam Soil.**—ALWAY, F. J., and NELLER, J. R., in the *Journal of Agricultural Research*, Vol. XVI, No. 10, pp. 263-278. Bibliography of 12 works. Washington, March 10, 1919.

There exist very few data as to the influence of organic matter upon the water-holding capacity of soils. The investigations of the writer have contributed to our knowledge of the subject. His paper reports a detailed study of the moisture conditions of two adjacent plots at the Minnesota Experiment Station. In both plots, the soil was a silt loam, very uniform in texture, but differing widely in content of organic matter, as the result of great differences in cultural

treatment. During the cool wet summer of 1915, the surface foot, and this alone, showed a very marked difference in moisture content, especially in available moisture, the soil which was the richer retaining the most water. In the warmer and somewhat drier summer of 1918, however, when winter rye was grown, much smaller differences were found.

It is therefore concluded that, in the case of a finer textured soil, with a fine-textured subsoil, and a comparatively level surface, the differences in the water-holding capacity that may be caused by differences in manuring, or in cultural operations, exert but little influence upon the productivity.

821.—**The Use of Explosives in Agriculture.**—I. BRUTTINI, A., in *L'Agricoltura italiana illustrata*, Year 1, No. 4, pp. 21-31, April 25, 1919.—II. *Idem*, *Ibid.*, No. 6, pp. 33-38, Milan, June 25, 1919. III. LARUE, P., in *Le Progres agricole et viticole*, Vol. LXXII, Year 36, No. 27, pp. 14-18. Montpelier, July 6, 1919.

Economic Expediency of the Use of Explosives.—Some people hold that it is not economically possible to use explosives in agriculture. This may be true of the ordinary trenching of an entire area either superficially or into the subsoil, in which case a large quantity of explosive is required. But if the displacement of the soil is limited to narrow strips for scooping out ditches or small patches, for opening up holes, for planting trees, for digging out drainage pits or for extracting the stumps of trees, there is economic expediency in using explosives even if their cost is rather high.

Agricultural Explosives.—Of the very great number of explosives that are known a few only are suited for use in agriculture, for which purpose they should combine power and rapid expansion, be easily transported, easily preserved, easily handled and of moderate cost. If ordinary black mining powder, which is not powerful enough and which decomposes in moist soil, is eliminated, 3 kinds of explosive can be used in agriculture: dynamite and other explosives derived from nitroglycerin; explosives made from chlorate of potash or perchlorates; safety explosives from nitrate of ammonia. Dynamite which explodes also under water is very useful in wet ground. Ordinary low standard dynamite containing 20-25% of nitroglycerine does quite well for agriculture. Chlorate of potassium and perchlorate of ammonia powder, which are very violent, can be used for breaking up a rocky subsoil or for blasting big rocks scattered over the surface of arable ground, but they do not suit ordinary ground or tree planting. The author considers that nitrate of ammonia explosives can be used in agricultural work because they are very safe.

In the article in the Institute Bulletin the author gives detailed instructions for the preservation and use of explosives, then he deals with the clearing and working of the soil with explosives under the following heads: (1) Clearing the surface or grubbing up the subsoil; (2) working bare or planted ground; (3) scooping out ditches; (4) opening holes in the subsoil for drainage in marshy ground; (5) stumping in dis-afforested land; (6) breaking up rocks on the surface.

There are further uses of an indirect character;—enriching the soil with fertilizers: destruction of moles, rats and insects infesting the soil, and of fungi injurious to plants, by means of poisonous fumes produced by explosions. The explosion causes a spheroidal cavity from which fissures radiate in all directions, but in clay soils, especially if they are very wet, the explosion throws particles from the centre to the pores of the surrounding ground and thus a cavity with hard compact walls is produced; the soil, instead of being reduced to fragments and fissured, is compacted and in worse physical condition than before the explosion. The use of explosives cannot therefore be recommended for wet clay soils.

Explosives disintegrate deep strata in all directions; they facilitate the work of farm implements and make the soil porous and absorbent to its greatest depths. In orchards explosives can replace deep digging if placed at suitable intervals between the trees.

Fissures in the soil facilitate the penetration of water and so in certain cases irrigation can be dispensed with.

The author notes results in various countries of the successful use of explosives in the preparation of fields, kitchen-gardens, vineyards, orchards and colonial plantations.

Scooping out of Ditches and Draining.—Displacement of soil with the help of explosives makes it possible to scoop out the ditches with simple labour with spade and shovel. In the direction which the ditch is to have, slightly inclined (25° to 45°) holes are bored 24 to 28 inches apart; the bottom of the bore should be 6 to 8 inches above the bottom of the ditch that is to be made. A single dynamite cartridge is placed in each hole except the middle one in which 2 or 3 cartridges are placed. The central charge is fired and causes the others to explode. With a single row of cartridges in not too hard ground ditches 5 ft. in width at the top, 3 ft. at the bottom and from 3 ft. to 5 ft. in depth can be obtained.

With 2 or 3 rows of cartridges in parallel holes ditches 16 ft. in width at the top, and 5 ft. in depth can be made.

A similar procedure is followed for making holes for planting trees. Explosives have proved very useful for draining marshy or

wet land through the subsoil by breaking through to a permeable stratum.

Breaking up Stumps and Rocks.—The most practical method of getting rid of stumps (especially big ones with strong roots) is by means of explosives. The charge is placed under the stump in a hole inclined at an angle of about 45° , at the point of greatest resistance and at a sufficient depth. Dynamite containing 25% of nitroglycerine and of slow action is the best for this work. Trees may also be felled by surrounding the trunk with a girdle of cartridges. To calculate the amount of explosive required the English method is as follows: after calculating the square of the circumference of the stump, this is divided by 3 if the tree has small roots, by 2 for trees well furnished with roots; no division is made in the case of trees with numerous very large roots. The quotient so obtained gives the number of ounces of dynamite (containing 25% of nitroglycerine). On the other hand some experimenters have found that for similar stumps and in similar ground the quantity of dynamite varies with the square of the diameter of the stump.

The author gives some technical details of the different operations and mentions some experiments also quoted by Professor Bruttini.

832.—*Alsatian Salts of Potash.*—I. BEAUVIERE, J., *Revue d'Agronomie*, Second part, 5 Potash. *Revue generale des Sciences pures et appliquees*, Year XXX, No. 13, pp. 411-412, Paris, July 15, 1919. II. *Communique du Bureau provisoire de Vente de la Potasse d'Alsace*. Mulhouse, July 10, 1919.

I. An estimated value of 50 thousand million francs is certainly not too high for the Alsatian potash deposits. When the war broke out the shafts sunk were almost all ready for exploitation and owing to the purity of the product they might have yielded in 1917 almost the same amount as central Germany, which considerably exceeded the French consumption. Measures have been taken since the beginning of 1919 to furnish French agriculture with as much Alsatian potash fertilizer as it needed, without administrative formalities. Already, during the early months of 1919, there was an output of 3,000 to 6,000 tons of Alsatian potash per week.

II. The mines of potash salts in Alsace are situated in the plain of Upper Alsace between the villages of Wittenheim, Wittelsheim, Staffelfelden, Bollwiller and Ensisheim. The potash salts are found in two beds separated by 20 m. of rocksalt. The lower bed, the only one worked, is the more important and ceases at a varying depth of 450 m. to 680 m.; it has a thickness of 2.5 m.—5.5 m. over an area of 200 sq. km.

According to the estimates of official geologists this bed alone contains two thousand million tons of potash salts, equivalent to 300 million tons of pure potash, or several hundred times the annual pre-war world consumption. The two beds of Alsatian potash are composed of sylvinite, that is to say of a mixture of sylvine (chloride of potassium) pure and crystallized, and of rock salt (chloride of sodium). At present 17 shafts are worked and others are under construction, so that the annual production can be increased to 1,200,000 tons. These shafts furnish two qualities of salt of different value: crude sylvinite, or sylvinite (kainite) containing 19 to 25% of chloride of potassium, and rich sylvinite (manure salt) containing 32 to 35% of chloride of potassium. These two salts are placed on the market crushed but untreated. After factory treatment, required for concentration, they attain a purity of 80 to 95% of chloride of potassium and constitute commercial chloride of potassium.

833.—Research on the Fertilizing Value of "Kalikalk," a New Potash Fertilizer, in Sweden.—SODERBAUM, H. G., in *Meddelande*, No. 163, Stockholm, 1918; summarized by CRISTENSEN, H. R., in *Tidsskrift for Planteavl.*, Vol. 26, Part I, pp. 186-187. Copenhagen, 1919.

A potash fertilizer is now sold in Sweden under the name "Kalikalk" (lime potash) which is made by crushing together felspar, limestone and gypsum, the mixture being then calcined at a temperature of 1150°C.

The author has tested the value of three samples of "Kalikalk" containing varying proportions of its ingredients. The potash (K_2O) content was between 5.4 and 5.8%. Out of 100 parts of potash 74 to 98 were soluble in 4% hydrochloric acid and 52 to 71% in distilled water. Besides potash, "Kalikalk" contains about 37% of silicic acid, about 33% of lime, about 10% of clay, 8 to 10% of sulphuric acid (SO_3), 0.75 to 2% of magnesia, 1.75% of soda, 0.20 to 1.75% of oxide of iron. The fertilizing value of the three above mentioned samples of "Kalikalk," compared with that of sulphate of potash, was tested on oats grown in glass cylinders containing about 9 kg. of peat mould very poor in potash. As fundamental fertilizer 13.5 g. of carbonate of lime, 7.26 of basic slag, 4.5 g. of Chile saltpetre, 1 g. of sulphate of magnesium and 1 g. of chloride of sodium were placed in each cylinder. The amounts of "Kalikalk" added were 1.5 g. and 2 g. for each cylinder.

On the whole the tests have shown that the potash in "Kalikalk" has an excellent fertilizing effect, as was expected from the chemical analysis of this new fertilizer. "Kalikalk" had even a somewhat greater fertilizing value than sulphate of potash

and had a particularly good effect on the yield of grain. The respective fertilizing values of the three different samples tested were approximately equal.

Some of the Effects of the War Upon Fertilizers in the United States.—VAN SLYKE, L. L., in *New York Agr. Exp. Station Bulletin*, 471, p. 10. Geneva, N.Y., 1920.

A study of data regarding commercial fertilizers, collected during the years 1914 to 1919 inclusive, reveals facts showing some of the effects of the war upon commercial fertilizers.

Effect upon kinds.—The number of complete fertilizers decreased each year, going from 614 in 1914 to 171 in 1919. The mixtures of phosphoric acid and potash practically disappeared by 1916, while mixtures of nitrogen and phosphoric acid appeared in relatively large numbers in 1916 and the following years. Acid phosphate brands increased, while nitrate of soda decreased, and potash salts entirely disappeared. Bone, blood and tankage decreased.

Effect upon composition.—In complete fertilizers the average percentage of nitrogen decreased appreciably after 1915, while that of potash decreased greatly after 1914, and still more after 1916. The average percentage of available phosphoric acid increased considerably after 1914, but with some variation from year to year. The total percentage of available plant-food decreased continually after 1914.

Effect upon cost.—The average retail cost of one pound of plant-food increased year by year continuously after 1914 in the case of complete fertilizers, going from 8.8 cents per pound in 1914 to 33.1 cents in 1919, an increase of nearly fourfold. In the case of acid phosphate, nitrate of soda, bone, dried animal manures, etc., there was an increase in the retail cost of plant-food, but not relatively as great as in the case of complete mixed fertilizers.

The Use of Lime on the Soil.—FIPPIN, E. O., in *Cornell Reading Course for the Farm*, No. 148, pp. 31-92. 1920.

This is a popular bulletin based on New York conditions, the main purposes of which are to explain some of the reasons for the need of lime in soils; to point out the indications of that need and its distribution over the State; to explain the different forms of lime that may be used, and to point out their limitations and advantages; to give some directions for the use of lime; and finally to present briefly data showing the value of lime as a means of soil improvement as revealed in experiment station tests and in farm demonstrations.

Improvement of Lime Nitrogen.—BAUMANN, J., in *Chemiker Zeitung*, Vol. 44, No. 23, pp. 158-159. Kothén, Germany, 1920.

Some of the disadvantages of crude calcium cyanamid as a fertilizer are reviewed, and it is proposed to obtain the nitrogen of this fertilizer in a more suitable form by combining the cyanamid and ammonia-soda processes. The ammonia for the process is to be obtained from calcium cyanamid, and the liquors from the sodium bicarbonate, which contain ammonium chloride and sodium chloride, are to be evaporated to crystallize out the ammonium chloride. The ammonia is thus recovered as chloride for use as a fertilizer, and the lime which would have been used for regeneration of the ammonia is used for the manufacture of cyanamid. It is estimated that considerable saving can be effected by the proposed combination of the two processes. Alternate processes are also suggested.

Plant Analyses and the Fertilizer Requirements of Soil.—MUNTER, in *Journal für Landwirtschaft*, Vol. 67, No. 4, pp. 229-266. Berlin, 1919.

The results of fertilizer and rotation experiments begun in 1902 with beets, barley, potatoes, and wheat on a loess loam soil are reported.

Final results were obtained with wheat only. It was found that potash and phosphoric acid fertilization increased the silica content of wheat straw, and nitrogen fertilization reduced it. Potash and phosphoric acid fertilization reduced the nitrogen, lime, and magnesia contents of the straw, and nitrogen fertilization increased them. Potash slightly reduced the nitrogen content of the grain, and phosphoric acid strongly depressed it. A chemical analysis of the wheat plant from fertilized soil gave no sure indication of the fertility condition of the soil.

It was further found that in good cropping years nitrogen had the greatest influence on crop growth, and in poor years potash had the greatest influence. Phosphoric acid acted indifferently in this respect. Fertilization with an excess of nitrogen, potash, or phosphoric acid was mainly evident in the straw. The weather conditions of a year exercised a strong influence on the assimilation of nutrients by wheat, and the relative percentage of nutrient content was more strongly influenced in individual years by the weather than by fertilization.

It is believed that the nitrogen requirements of the soil used are indicated by the contents of nitrogen, lime, and magnesium in the wheat plant. When the sum of these three for 1 acre exceeds 80 lb. in the grain and straw, 55 lb. in the grain alone, or 25 lb. in the straw alone, there is sufficient nitrogen present in the soil. If, after

subtracting the sum of these three, the figures for the potash percentage are positive, there is sufficient soil potash, but if negative the soil is deficient in potash.

The wheat plants on plats receiving no fertilization and complete fertilization showed generally the same percentage content of nitrogen and phosphoric acid, while the potash content of the straw was higher on the completely fertilized plats. A comparison of analyses of plants from unfertilized and completely fertilized plats gave no indication of the fertilizer requirements of the soil.

It is concluded that the fertilizer requirements of a soil are best indicated when studied by growing and analyzing plants under two excess fertilizations, namely, nitrogen and phosphoric acid plus potash. If the nitrogen-potash ratio is narrower than 1:2 there is a potash deficiency. If the nitrogen-phosphoric acid ratio on the nitrogen plats is wider than 100:35 there is a phosphoric acid deficiency. If the ratio of nitrogen to phosphoric acid on the phosphoric acid potash plats is narrower than 100:60, or if the silica:nitrogen ratio is greater than 100:6 there is a nitrogen deficiency. If the percentage of nitrogen found in the wheat straw from the nitrogen plat is placed at 100 there is sufficient nitrogen present in the soil of the phosphoric acid potash plat provided the ratio of the two nitrogen percentages is narrower than 100:60.

Sulphur in Relation to Soil Fertility.—STEWART, R., in *Illinois Agr. Exper. Station, Bulletin* 227, pp. 99-108. Urbana, Ill., 1920.

The available data on the value of sulphur as a fertilizer are summarized, leading to the conclusion that there is no basis for the belief that it is necessary to add sulphur to soil in a permanent system of soil fertility.

Experiments extending over a period of years are reviewed, showing that under Illinois conditions sulphur is not a factor on brown silt loam soil in the production of such common farm crops as corn, oats, wheat, clover, and alfalfa. It is further shown that the sulphur supply of the soil is automatically replenished from the atmosphere, and it is concluded that the relation of sulphur to soil fertility is not in any sense similar to that of phosphorus, but is more similar to that of carbon on the basis that both sulphur and carbon are supplied to crops from the atmosphere.

Can the Farmer Mix His Own Fertilizers? TAYLOR, F. W., in *New Hampshire Agr. Exp. Station, Circular* 21, pp. 3-8. Durham, N.H. 1920.

Analyses of 21 samples of home-mixed fertilizers obtained from farmers in New Hampshire are reported and discussed.

It was found that the average of the nitrogen determinations of the 21 samples was within 0.06 per cent of the amount calculated. The average percentage of phosphoric acid was 2.34, and of potash 0.97 per cent higher than that calculated.

It is stated that variations almost as wide as these were found in 34 samples of complete factory-mixed fertilizers. The rather wide discrepancies in the phosphoric acid figures are attributed to the assumption that there was a smaller content of available phosphoric acid in the mixing ingredients than actually existed. It is considered true that the farmer can mix his own fertilizers fairly well.

The Partial Sterilization of Soils.—RUSSELL, E. J., in *Journal of the Royal Horticultural Society*, Vol. 45, No. 2-3, pp. 237-246. London, July, 1920.

Partial sterilization of the soil has been found to be an effective and in some cases the only means of eradicating organisms noxious to plants. Of the various methods tested, steam is decidedly the most efficacious and reliable, as it kills all organisms by bringing about a certain amount of decomposition. Owing to the expense involved with this method experiments have been carried out to find an efficient chemical sterilizer. The use of chemicals for this purpose is not only cheaper, but also more convenient. It is most essential that the substance should disappear from the soil after its work is done. This may occur by evaporation, oxidation or decomposition. The various substances tested include carbon bisulphide, toluene, cresylic acid (liquid carbolic acid) and chloropicrin. The latter is one of the best, and proved fatal to eelworms and wireworms besides being harmless to plants, but it is unfortunately very awkward and dangerous to handle.

Toluene and carbon bisulphide are unreliable. Although liquid carbolic acid was not nearly as effective as steam, it has proved the most convenient of all the chemical substances for use on a large scale.

In laboratory experiments its effectiveness against eelworms and fungi is improved by introducing chlorine atoms.

The method of using cresylic acid is to add 1 gal. of the acid to 40 gals. of water and apply the mixture to 9 to 19 sq. yds., followed by heavy watering. In the case of heavy soil the acid is applied in two doses at an interval of 14 days, the land having been previously dug over to a depth of 1 spit. Planting can begin at the end of one month. Good results can be obtained with half the dose.

Correlation Between Depth of Eyes and Degeneration Among Potatoes.—WHIPPLE, O. B., in *Proc. Amer. Soc. Hort. Science*, Vol. 16, pp. 181-183. College Park, Md., 1920.

After three years' work at the Montana Experiment Station with a deep-eyed potato variety in an endeavour to improve the commercial value by selecting to a shallower-eyed type, the yielding power was greatly reduced, and careful field counts showed 90 per cent of the plants to possess degenerate tendencies. Studies of hills and tuber characteristics in seed plats planted in 1919 on a tuber-unit plan and classified as normal-vigorous, intermediate, and degenerate, showed conclusively that shallowness of eye was correlated with degeneracy. In practically all varieties, the most perfect tubers as regards size, form, and depth of eye, came from intermediate plants, while in advanced degenerate types the depression about the eye was often entirely absent.

Hill Selection of Potatoes Where Rapid Degeneration is Prevalent.—WELLINGTON, R., in *Proc. Amer. Soc. Hort. Science*, Vol. 16, pp. 175-179. College Park, Md., 1919.

Hill selection experiments at the Minnesota Experiment Station, where potato varieties had been degenerating or "running out" very rapidly for many years, are described. It is stated that efforts made to select strains resistant to degeneration ended in total failure. High and low-yielding hills and tubers possessing so-called desirable and undesirable characters followed the same course, low-yielding hills often giving the better results.

Experiments on the Spacing of Potato Plants.—STEWART, F. C., in *New York Agricultural Experiment Station Bulletin* 474, pp. 32. Geneva, N.Y., 1920.

The principal object of the experiments here described was to determine the feasibility of employing close planting in the production of seed potatoes as a means of improving the quality of the crop through a reduction in the average size of the tubers.

The experiments were conducted at Geneva during five seasons and devoted, chiefly, to a comparison of 6 by 36 inch planting with 15 by 36 inch planting. The soil was a heavy clay loam of medium fertility. The variety Sir Walter Raleigh was used in 1914, 1915, 1917, and 1918, and Enormous No. 9 in 1919. Rows of thick and thin planting were alternated. At harvest time, the product of each row was sorted, according to weight, into four grades and the tubers of each grade weighed and counted. The grades were: (1) Under one ounce; (2)

from one to two ounces; (3) from two to twelve ounces; and (4) over twelve ounces.

In different seasons, the total number of tubers over one ounce in weight varied from 41,847 to 63,600 per acre for thin planting, and from 71,603 to 97,150 per acre for thick planting. The difference in favour of thick planting varied from 29,281 to 34,550 tubers per acre.

In total quantity of tubers over one ounce in weight, the yield varied, in different seasons, from 144.5 to 340.8 bushels per acre for thin planting and from 191.8 to 384.4 bushels per acre for thick planting. The difference in net yield (total yield minus seed) of tubers over one ounce in weight varied from 24.9 to 46.6 bushels per acre, and averaged 34.7 bushels per acre, in favour of thick planting. Over one-half of this difference (18.7 bushels), consisted of tubers over two ounces in weight.

The average weight of tubers over two ounces in weight was reduced from 10.5 to 22.8 per cent by thick planting. For table use, the size of the tubers of the crop from thick planting was superior to that from thin planting in 1914 and 1919, but in the other three seasons the tubers from thin planting were the better in this respect.

The results of the experiment appear to warrant the following conclusions: In the production of seed potatoes of varieties of the Rural group, New York growers may well consider planting considerably closer than 15 by 36 inches, since, thereby, the net yield is likely to be increased and the quality of the crop improved, particularly on rich soil. In the home seed-plot the spacing in the row should be as close as is consistent with roguing; but if the crop is to be sold the difficulty in disposing of the small tubers may necessitate somewhat thinner planting, except on rich soil. Potatoes grown in rich garden soil, for table use, may be planted as close as 6 by 30 inches with advantage.

Alsike Clover.—PIETERS, A. J., in *U.S. Department of Agriculture, Farmers' Bulletin* 1151, pp. 25. Washington, D.C., 1920

Alsike clover is most at home in northern latitudes or at high altitudes. It thrives best in a cool, moist climate.

In the Ohio Valley alsike clover is especially adapted to low, wet, fertile land. On such land it will yield heavy crops of first class hay and it will make more than one crop in a season.

This crop will grow on "sour" land on which red clover will not thrive. Where it is not possible to apply lime and so ensure a stand of red clover, alsike clover may be used. Mixed with red clover on uplands, alsike clover ensures a stand on spots where red clover does not catch.

Alsike clover is used mostly in mixtures with timothy or other grasses. In such mixtures it improves the hay and increases the yield. The grasses serve to support the clover and make it easier to cut and cure. Alsike clover will endure overflow that would kill most crops. It has been known to grow a year in water-soaked and water-covered soil and make a heavy growth. In the south it is recommended for creek bottoms and other wet lands.

It is a good pasture plant, often remaining in a permanent pasture for many years. It is a good clover to seed in swales or on wet, natural meadows. It volunteers readily and will spread in such places.

Its disadvantages are that—

On uplands alsike clover grows short and does not make a mass of growth equal to that of red clover. Alsike clover makes no second crop except on low, rich land. On uplands the pasturage after cutting for hay or a seed crop is too small to be useful. There appears to be some danger to horses and mules of a little-known disease said to result from eating alsike clover.

LIVE STOCK AND BREEDING

919.—Immunity in Epizootic Lymphangitis.—BOUET, A., and NEGRE, L. in *Comptes rendus de l'Académie des Sciences*, Vol. 168, No. 8, pp. 421-423. Paris, February 24, 1919.

Experiments on epizootic lymphangitis have shown the contrast between the extremely contagious nature of the disease, and the almost impossibility of reproducing it artificially. Most of the writers who state that they have obtained positive results were working in infected surroundings.

The writers have succeeded on several occasions in reproducing epizootic lymphangitis in the horse by means of inoculation with cultures of cryptococci and the total results obtained show that re-inoculation greatly increases the effect of the first inoculation. As regards the immunity obtained, the writers sum up their conclusions as follows:—

(1) The subcutaneous inoculation of a culture of cryptococcus gives rise to a nodule which forms an abscess, and heals without spreading; the extension and generalization of the initial lesion are produced by the re-inoculation of these cocci.

(2) In the case of an organism rendered susceptible by a first inoculation, the incubation period of the re-infection nodule is shorter than that of the primitive one.

(3) Animals suffering from natural, or artificially produced, lymphangitis become slowly immune; total immunity is not obtained until 50 days after the first inoculation.

922.—Cattle Scab Methods of Control and Eradication.—IMES, M., in *Farmers' Bulletin* 1017, U.S. Department of Agriculture, 29 pp. Washington, December, 1918.

A popular account of scabies in cattle. The writer dwells upon the following points—the nature and habits of the mites causing this disease; the symptoms produced by the different species: (*Psoroptes communis bovis*, *Sarcoptes scabiei bovis*, *Chorioptes bovis* and *Demodex folliculorum bovis*); ways of distinguishing the various types of cattle scab; control of the disease by dipping and spraying. He gives a series of very clear figures showing how a dipping-vat for infected cattle may be constructed. The dips most recommended are the lime-sulphur dips made in the proportion of 12 lb. of unslacked lime and 24 lb. flowers of sulphur per 100 gallons of water, and nicotine dips (using at least 0.05% of nicotine) either with or without 1.9% flowers of sulphur; during dipping the temperature should be maintained at from 95° F. to 100° F. in the case of the nicotine dip.

Crude petroleum dips are an effective remedy against scab, but the oil is apt to injure the cattle.

925.—Hemorrhagic Septicemia.—WASHBURN H. J., in U. S. Department of Agriculture, *Farmers' Bulletin* 1018, 8 pp. Washington, October, 1918.

A bulletin issued for the special purpose of telling how this disease can be recognized and prevented.

Hemorrhagic septicemia is a contagious disease caused by *Bacillus bipolaris septicus*; it is known as stockyard fever, when it attacks cattle; swine plague (contagious pneumonia), and is not easily distinguished from hog cholera; fowl cholera when it attacks fowls, pigeons, geese, etc. In swine and sheep, the malady often assumes an acute form (pneumo-enteritis) and death ensues in a few hours. No form of treatment has time to become effective. The injection of bacterins (bacterial vaccines) has proved useful in many instances in preventing the spread of an outbreak and protecting the unaffected portion of the flock, or herd.

933.—Important Poultry Diseases.—SALMON, D. E., in U.S. Department of Agriculture, *Bulletin* 957, 48 pp. Washington, March, 1918.

In this Bulletin, the causes, symptoms and treatment of each of the diseases are described. The following diseases are dealt with:—Contagious catarrh (croup) (pathogenic agent unknown); fowl diphtheria (virus filterable and invisible); bird or chicken pox (virus filterable, same as that

of diphtheria); fowl cholera (*Bacterium avisepticum* and diseases of cholera-like nature (bacilli or *Bacillus coli* group); fowl typhoid (*Bact. sanguinarium*); white diarrhoea of chicks (caused by at least four different kinds of infection); *Bact. pullorum*, *Bact. avisepticum*, coccidia, *Aspergillus*); infection of *Bact. pullorum* confined to the ovary; *Coccidiosis*; brooder pneumonia or *Aspergillosis* (*Aspergillus fumigatus*); tuberculosis; entero-hepatitis (*Amoeba meleagridis*); gout (abnormal quantity of uric acid in the blood); gapes (*Syngamus trachealis*); intestinal worms (*Ascaridia perspicillum*, *Heterakis papillosa*, *Davainea echinobothridia*, etc.); favus, white comb (*Lophophyton gallinae*); lice; mites (*Dermanyssus gallinae*, etc.); depluming scabies; scaly leg; ticks (*Argas miniatus*, etc.); crop-bound or impacted crop; inflammation of stomach, or intestines; limberneck, paralysis of the neck muscles (a symptom of many diseases).

937.—Food Value of Couch-Grass: Research in Sweden.—WEIBULL, M., in *Landtmannen Tidskrift for Landman*, Year 1, No. 17, p. 281. Stockholm, April, 1918.

The author had the opportunity of analyzing some samples of dried crushed couch-grass and obtained the following data (percentages):—Protein 8.3; fat 1.2; nitrogen-free extract 62; cellulose 16.5; ash 5; water 7. It is evident that, in a time of scarcity, couch-grass can be used as cattle food; its nutrient value is nearly the same as that of hay, from which, however, it differs by its smaller cellulose content, which is rather advantageous. The nutrient value of couch-grass has already been recognized in other countries; according to Pott, couch-grass is often used, in Normandy, in place of oats in horses' rations; animals eat it eagerly with good results. Although the protein and fat contents of couch-grass are smaller than those of oats, couch-grass contains the same glucoside as oats, that is to say coniferin, which in the animal organism serves in the synthesis of vanillin. The author adds that couch-grass is specially suitable for horses and sheep.

945.—A Comparison of Concentrates for Fattening Steers, in the United States.—WARD, N. F., JERDAN, S. S., and LLOYD, F. R., in *United States Department of Agriculture, Bulletin* No. 761, 16 pp. Washington, April 7, 1919.

I. The comparative value of cottonseed meal, cold-pressed cottonseed cake, and a mixture of cottonseed meal and maize for fattening steers. To make a comparison of the relative feeding value of cottonseed meal, cold-pressed cottonseed cake, and a

combination of cottonseed meal and corn and-cob-meal, these three different concentrates were fed, with the same kinds of roughage, to 3 lots of 25 steers each, raised in Mississippi, aged 2 to 3 years and averaging 860 lb. in weight at the beginning of the experiment.

When on full feed each steer got:—

Lot I.—Cottonseed meal 7.4 lb. + corn silage 41.8 lb.

Lot II.—Cold-pressed cottonseed cake 11 lb. + corn silage 31.5 lb.

Lot III.—Cotton seed meal 6 lb. + corn-and-cob meal 3 lb. + corn silage 37 lb.

The steers of Lot II, which received cold-pressed cottonseed cake consumed much less silage than the others, because of the larger amount of dry matter in the concentrates of their ration.

The average daily gain in weight per head was 2.04, 2.01, and 2.05 lb. respectively for the 3 lots, or practically the same for all. The greatest variation in the total gain was 4 lb. per head during a period of 123 days.

The cost of the foods was as follows: cottonseed meal \$22.50 per ton, cold-pressed cottonseed cake \$16.50 per ton, corn 70 cents per bushel, cowpea hay \$10 per ton, silage \$3 per ton. The feed cost per pound of gain in live weight was respectively 7.0, 6.8, and 7.8 cents for the 3 lots and the net profit per head was \$5.45, \$5.50, and \$4.58, respectively.

Cottonseed meal at \$22.50 per ton, is as economical as cold-pressed cottonseed cake at \$16.50, for 3 lb. of the former were of equal feeding value as 4 lb. of the latter. The former contained 40.4% of protein and the latter 27.6% of protein; the cold pressed cotton cake was eaten readily from the first by all the steers.

There was no advantage in feeding a one third ration of corn-and-cob meal combined with cottonseed meal. The degree of finish for the 3 Lots was the same and all sold at the same price, viz., \$7.35 per hundred pounds.

The average dead-weight yield was 59.4%, 59.1%, and 58.8% respectively, which is high.

II. Comparison between the rations: (a) cottonseed meal; (b) one third cottonseed meal + two thirds broken-ear corn; (c) one third cottonseed meal + two thirds shelled corn; for fattening steers. Each of these three rations differing in concentrates was fed for 141 days to a lot of 25 two and three year old steers whose average initial weight was 825 lb. When on full feed they got the following daily rations:

Lot I. Cottonseed meal 7 lb. + corn silage 40 lb. + oat straw 5 lb.

Lot II.—Cottonseed meal 3.5 lb. + broken ear corn 8.7 lb. + corn silage 36 lb. + oat straw 2 lb.

Lot III.—Cottonseed meal 3.5 lb. + shelled corn 7 lb. + corn silage 38.5 lb. + oat straw 2.4 lb.

The steers of the 3 lots gained 1.56, 1.66 and 1.70 lb. per head per day on the average for the period of 141 days. The final average weights were 1,044, 1,059 and 1,066 lb. respectively.

The feed cost per pound of gain was respectively 9.53, 10.82 and 10.75 cents. Lots II and III were accompanied by a herd of 25 hogs to consume the incompletely digested corn in the dung. The net average profit per head was \$15.19 for Lot I, \$11.87 for Lot II, and \$11.48 for Lot III, if no credit is given for the gain in weight of the hogs, which was about \$3 per steer.

Without hogs following the steers the feeding of corn would have been considerably less profitable than feeding with cottonseed meal alone; but as carried out the use of corn gave approximately the same profit. The dressed yields of each lot were 58.2%, 57.8% and 57.4% respectively; the carcasses were well covered with fat. The steers sold for \$8.60 per 100 lb. live weight, except one steer of Lot I, which sold for \$8 per 100 lb. In this experiment it is assumed that the cost of labour was covered by the value of the manure.

948.—Correlation Between the Percentage of Fat in Cows' Milk and the Yield.—ROBERTS, C., in *Journal of Agricultural Research*, Vol. XIV, No. 2, pp. 67-96. Washington, July 8, 1919.

It is a generally accepted opinion that cows with a large yield of milk produce a smaller percentage of fat than do cows with a small yield of milk. To what extent this is true, has, however, up to the present time never been demonstrated by careful scientific investigation. From the study of the records of 2,166 Ayrshire cows, James Wilson (The Separate Inheritance of Quantity and Quality in Cows Milk, in *Scientific Proceedings of the Royal Dublin Society*, New Series, Vol. XII, No. 33, pp. 470-479, 1910) concluded that yield of milk and percentage of fat were inherited independently of each other.

In a criticism of this work (Note on the Separate Inheritance of Quantity and Quality of Cows' Milk, *Biometrika*, Vol. VII, No. 4, pp. 548-550, 1910) K. Pearson, by means of a correlation table, showed that with an increase in the yield of milk, there was a small but significant decrease in the percentage of fat.

In a later work (The Principles of Stock Breeding, pp. 121-122, London, 1912), J. Wilson states that high quality of milk,

that is to say milk rich in fat, is produced by cows giving all kinds of yields high, average, or low, and the same may be said as regards milk of low quality. These facts would appear to prove that yield and quality are independent characters. It seems to the writer, however, that it would be well to make a more careful statistical investigation of the matter.

A large body of data forming the greater part of the material for this investigation was furnished by the registers of the different American Associations for breeding milch cows. Only yearly tests were used. The method of finding the relation between the percentage of fat and the yield of milk was by means of the correlation table. The cows were divided according to their ages at the beginning of the experiment into the following 4 groups:—2 to 3 years; 3 to 4 years; 4 to 5 years; 5 years and over.

The writer concludes from the results of his investigations, that a significant negative correlation exists between the percentage of fat in cows' milk and the yield for Jerseys, Guernseys, Holstein-Friesians, grade Jerseys, grade Holstein-Friesians, and cows unclassified as to breed. The correlation for Ayrshires is not significant in the subgroups classed in respect to age, but it is significant when these groups are treated as a whole.

The yield of milk increases with age. However, since all cows 5 years of age and over are classed together, it may well be that the yield decreases at some period beyond 5 years. Pearl and Patterson (*The Change of Milk Flow with Age from the Seven-Day Records of Jersey Cows, Maine Agr. Exp. Sta. Bull. 262, pp. 145-152, 1917*) showed that in Jersey Cows, when the 7-day records were used, the maximum production is reached between the eighth and the ninth year.

C. Crowther (*Variation in the Composition of Cows' Milk, Journal of Agricultural Science, Vol. I, part 2, pp. 149-175, 1905*), from his records of Ayrshires, is of the opinion that maximum production is close to the eighth year. In the Jerseys, Guernseys, and Holstein-Friesians the percentage of fat remains fairly constant for the different ages studied. However, the group of animals 5 years of age and over in the Jerseys and Guernseys shows a slightly lower percentage of fat than the younger groups. In the case of the Ayrshires, there is a gradual decrease with age. Between the youngest and the oldest groups there is a difference of 0.15%. When judged by the standard deviation, age has no influence in the variability of the percentage of butter fat. But the class 5 years of age and over is more variable in the yield of milk than the younger groups.

This may be due to the inclusion in this group of old cows whose milk has decreased.

Using the standard of deviation as a basis of comparison, it is found that the breed has an influence on the variability of milk yield and percentage of fat. For variability in yield the breeds stand in the following order in an ascending scale:—Jersey, Ayrshire, and Guernsey practically the same, then Holstein-Friesian. For percentage of fat, the order is: Holstein-Friesian and Ayrshire about the same, Guernsey, Jersey.

The average production of milk is as follows:—Holstein-Friesian 14,443.1 lb.—Ayrshire 9,417.1 lb.—Guernsey 8,644.4 lb.—Jersey 7,491.4 lb. The average percentages of fat for the different breeds are:

Jersey 5.392 lb.—Guernsey 5.033 lb.—Ayrshire 3.933 lb.—Holstein-Friesian 3.435 lb.

952.—*The Open Shed Compared with the Closed Barn for Dairy Cows.*—WOODWARD, T. E., TURNER, W. F., HALE, W. R., and McNULTY, J. B., in U.S. *Department of Agriculture, Bulletin No. 736, 13 pp., Washington, D.C., November 15, 1918.*

Twenty-one cows were used in the experiment herd, being divided into two groups, which were kept alternatively in the open shed and the closed barn for three years.

In general, little difference could be noted in the contentment of the cows under either open-shed or closed-barn conditions. There seems to be little, if any, difference in the amount of actual sickness observed under the two conditions. But the closed barn was a modern, well ventilated structure, and in many of the common poorly ventilated dairy barns the impure air would doubtless be an important factor in determining the comparative merits of the system. The period of housing cows is placed at an average minimum of five months, from November to March, for most sections of the United States.

The results of the experiments are summarized as follows:

The cows consumed somewhat more feed and produced slightly more milk when kept in the open shed than when kept in the closed barn. The increase in production was not large enough to offset the extra feed cost.

When kept in the open shed there was a tendency for "boss cows" to deprive weaker individuals of their feed and of the normal advantages of the shed, which resulted in lower milk yields from the weaker and more timid cows.

All operations considered, milking and feeding excluded, slightly more labour was required to care for the cows when kept in the open shed. The manure was apparently well preserved, until it could be hauled to the

land, under the open-shed system. It was also handled more economically than in the closed barn. Cornstalks in the manure were sufficiently decomposed to be handled successfully with the manure spreader.

Under the open-shed system, 68 per cent more bedding was required for each cow, but the cows were cleaner and more comfortable. There was little difference in the time required to bed them under the two systems. It is possible to use cornstalks or other coarse material for bedding in the open shed.

There appeared to be little if any difference in the frequency of injuries to cows under open-shed or closed-barn conditions.

959.—On the Possibility for Breeders to Obtain Cocks or Hens According to Their Wishes.—LIENHART, in *Comptes rendus de l'Académie des sciences*, Vol. 169, No. 2, pp. 102-104. Paris, July 15, 1919.

The author's procedure consists in knowing how to recognize sex in the egg before incubation has commenced.

In all kinds of fowls, the cock is always larger and heavier than the hen of equal age. The difference in the weights of the respective sexes varies, according to the breed, between 0.5 kg. and 1 kg. or sometimes even more. The author has remarked that the difference of weight, in a less degree, is noticeable in chickens; it even appears in the very young chicks (differences of 18 to 27 gm. for chicks of 5 days old). It was, therefore, natural to think that this difference in weight would also be found in the egg, but it was necessary to furnish experimental proof.

A first attempt gave no results, having been made with eggs of mixed breed hens. In fact, in a mixed breed all the hens, even if they belong to the same brood, do not lay eggs of similar weight. They group themselves, in this respect, according to their respective origins, and in the same hen-house where all the layers are similar, that is to say all of equally mixed breed, distinct families exist, from the point of view of the average weight of the egg, regular lines which can be separated by selection, some laying small eggs, others eggs of medium weight and others again that lay large eggs. Consequently, in choosing for experiment the larger eggs out of a lot laid by mixed bred hens one simply eliminates all the eggs of maximum weights laid by the lines giving small eggs and takes only those of lines giving large eggs, and selection of eggs is illusory. It is therefore indispensable to carry out the experiment with eggs laid by a pure bred race. This is what the author did in the spring of 1918, working with Leghorns. In that breed, the average weight of the cocks is 3 kg., and of hens is

1.90 kg.; the average weight of eggs is 62 gm.; the difference between extremes is 16 gm., the smallest eggs weighing 54 gm. and the largest 70 gm.; few eggs weigh less than 58 gm. or more than 66 gm. Sixty eggs, laid by hens all belonging to one brood and chosen out of the largest of a lot of 350, were placed in the incubator (these eggs weighed between 59 and 70 gm. each.) On hatching, they gave 48 chicks of which 37 were cocks and 11 hens, a proportion of 77 per cent of cocks. This result is convincing. It can, therefore, be affirmed that for a given breed and a homogeneous brood the heavier eggs ought to produce cocks and the lighter eggs hens.

The author has tried still further to improve his method. As all young hens of 1 year old lay eggs noticeably smaller and lighter than the normal average, and as, on the other hand, in the course of the year, the eggs of the same layer, even if she is full-grown, are noticeably smaller at the beginning and at the end of the laying season than in the middle, it is indispensable that all the laying hens should be of equal age and that the eggs should be collected when the laying is at its maximum. It would be well to set all the eggs of the selected lot separating the heavier from the lighter.

By marking on each egg set to incubate its exact weight, by breaking it when it is about to hatch and by making a post mortem examination of the chick to find out the sex, it should be possible to find, with regard to the initial weight of the egg, the sex which it contained and thus know the weight at which the determination of sex by weighing becomes doubtful, for a given breed.

960.—Correlation Between Egg Production During Various Periods of the Year in the Domestic Fowl.—HARRIS, J. A., and BLAKESLEE, A. F., in *Genetics*, Vol. 3, No. 1, pp. 27-72, bibliography of 6 works. Princeton, N.J., Jan., 1918.

Results of a biometric study of the relationships between egg laying during different periods of the year in White Leghorn hens. The constants are based on two international egg-laying competitions held at Storrs, Connecticut. The constants for each of the two years are in very close agreement with each other.

There is a significant positive correlation between the number of eggs laid by a hen in any month of the year and the number of eggs laid in the whole year. The correlation coefficient r varied between 0.38 and 0.69 in 1913-1914, and between 0.37 and 0.70 in 1914-1915; during these two years the average was 0.550 and 0.562 respectively.

The correlation between the record of one month and the egg production of the year, serving as a basis for formulae by which

the production for the whole year may be predicted, has great practical importance. As a biological constant it has the disadvantage that it is, to a certain extent, spurious, due to the fact that the monthly egg-laying figures are included in the annual total which is correlated with each month's production. That is the reason why the authors have studied the correlations between each month's record and the production of the other 11 months of the year.

These correlations, like those between the monthly and annual egg production, are positive and are significant from a statistical point of view; they varied between 0.30 and 0.57 in 1913-1914 and between 0.24 and 0.57 in 1914-1915. The constants are on the average 21% less than those expressing the correlation between the monthly and the annual production.

The high egg production of a hen does not, therefore, generally depend much on a high production in a given month, but on a permanent differentiation (at least during the first year of laying) in the egg-laying capacity of the hen. This conclusion is fully confirmed by the correlations between the monthly records. These are always positive, but not uniform in magnitude. Two laws governing the intensities of these relationships are discernible, although they tend mutually to obscure each other:—(1) the correlation between the monthly egg production tends to become smaller as the two months considered are more widely separated; (2) the correlation between the egg production of the autumn and winter months, at the beginning and end of the year of the competition, is closer than that between the egg production of the spring and summer months.

The relative influence of the various months of the year on the variations in the annual production differs greatly. The authors have shown that, during the winter months (November, December, January and February), and the following autumn months (August, September and October), the egg production is greater than the theoretical production when the total annual production exceeds the normal. The spring and summer months, from March to July, contribute relatively less to the excess of the total above the normal egg production.

From a practical point of view, the result of greatest importance is the demonstration of the fact that trap-nesting and record throughout the year are not necessary for obtaining conclusions of great value. The record of one month suffices for dividing the hens into groups differing widely in annual egg production. It would, therefore, be possible, at the commencement of the

laying season, after one month to divide the flock approximately into two halves, one of which will lay on the average, 136 to 139 eggs a year and the other from 167 to 170; or, if it is thought desirable to retain only a quarter of the flock for laying, a production of from 176 to 187 eggs annually per hen may be secured. The selection of hens for breeding purposes in September or October would be made among the quarter containing the best laying hens of the flock whose annual average egg production would be about 190 eggs per hen.

FARM ENGINEERING

968.—The Garner Tractor.—*The Implement and Machinery Review*, Vol. 45, No. 530, pp. 234. London, June 1, 1919.

The "Garner" tractor derives its title from the fact that it is placed upon the market by Messrs. Henry Garner, Ltd., Mosely Motor Works, Birmingham. It is of the four-wheel type, the two front wheels steering. The engine, flywheel housing, three-speed gear box and rear axle are all firmly bolted together.

A small frame, fitted to the engine bearers, and carried around the front, forms a central pivot for the front axle and transverse spring. The four-cylinder engine, cast in one piece, has a 4½ inch bore, with a stroke of 5½ inches. It develops 28.9 h.p., and the governed speed can be varied from 900 to 1,200 revolutions per minute. The carbureter is designed to start on petrol, and run on paraffin, and the ignition is by high tension magneto. A radiator of large capacity secures efficient cooling under all working conditions. The clutch is operated by a foot pedal, and though totally enclosed, is accessible by means of the large inspection cover provided. The clutch takes up the load gradually. Three speeds—of 1½, 2¾ and 5 miles per hour—and a reverse are provided. The rear wheels, which have a diameter of 40 in. and a width of 10 in., are fitted with easily detachable spuds; whilst the front wheels are of 30-in. diameter. Internal expanding brakes act directly on the rear wheels, and are operated by foot pedals; whilst a front transverse spring enables the machine to be used on the roads and also acts as a shock absorber. A pulley is mounted on the gear-box for stationary work, for driving threshing machinery etc.

The total weight of the tractor is 34 cwt. Its maximum height is 5 ft. 1 in., and its overall length 10 ft. 6 in. The "Garner" can operate a three or four-furrow plough on ordinary land and a two or three-furrow implement on stiff land.

RURAL ECONOMICS

The Cost of Producing Wheat in Kansas, Crop of 1919.—MOHLER, J. C., in *Kansas Bd. Agr. Quarterly Report*, Vol. 38, No. 151, pp. 31. Topeka, Kansas, 1919.

This is a summary of statements from 2,057 Kansas wheat growers, collected by the State Board of Agriculture in December, 1919, by means of a questionnaire carrying 245 questions on the cost of producing wheat. These growers represent every county in the State and both landowners and tenants.

The cost per acre is stated to have been less affected by the yield than the cost per bushel. For the State as a whole a loss of 43 cents an acre is shown for the crop of 1919, but in the main wheat belt (central Kansas) the loss reached \$1.52 an acre. Of the total wheat acreage in the State 76 per cent showed a loss and 24 per cent a gain. It is said, however, that these amounts do not show the full extent of the loss because in the calculations nothing was charged for the loss of fertility by the soil, the lack of compensation for overtime work, and the lack of proper employment for a portion of the year.

Tabulations are given, showing the number of acres, production, and value of winter and spring wheat for the year 1919, and detailed statements of the cost of producing an acre of wheat are included for the entire State, the eastern, central and western divisions, and the northern and southern sections of each of the latter.

AGRICULTURAL INDUSTRIES

1004.—Cooling of Milk and Cream.—GAMBLE, J. A., in *U.S. Department of Agriculture, Farmers' Bulletin* 978, 16 pp., Washington, 1918.

The author deals with the following points in a general statement of practical use in dairies, including the principles and technique of the refrigeration of milk and cream:—The necessity of rapid cooling—Development of micro-organisms in the milk—Principles of refrigeration—Use of refrigerants which operate on the surface of the cans—Cooling tanks for the milk—Use of water from wells or a spring for cooling the milk—Refrigeration of the milk during transport—How to stop adulteration of milk—Cream refrigeration.

1009.—Whale Meat.—*The Pastoral Review*, Vol. XXIX, No. 5, pp. 455. Melbourne, May 16, 1919.

Whale meat is coming into general use throughout North America, as it already is

in Japan. There are on the Pacific coast of America seven whaling stations in active operation, belonging mostly to United States and Canadian concerns. The Norwegians own a plant at Akitan, Aleutian Islands. There are two stations on Vancouver island, two on Queen Charlotte island, one at Bay city, Washington, one at Port Armstrong, and another on the Alaskan coast. Two of these have ample cold storage plants and the others have been developing them as the meat industry enlarged. The same two have big canning equipments, which the others are in process of duplicating. The nearest supply station at Bay city, Washington, put over 300 tons of whale meat on the American and foreign markets last season, including the canned output. These seven stations have reported the capture of 659 whales in 1917, and were expected at the close of 1918 to have reached the 1,000 whale mark. Whale meat in its preparation is treated, like other fresh foods, that is, after butchering, it is placed in ice in ship holds, taken to railway ports, and forwarded over the country in refrigerator cars.

The meat extends in great masses from the base of the skull to the tail fin and downwards to the middle line. This meat, all of it of the same quality, amounts, roughly, to 10 tons for each 50 ft. in length of the mammal. Seeing that a whale will go up to 75 ft. in length, there may be 15 tons of solid meat available on one carcass. Even a 50-ft. whale will produce as much flesh as 100 average steers or 500 sheep.

Whale meat has a similar appearance to that of beef. It is a little coarser in texture, and has a slight flavour of venison. It is usually served in the form of roasts and steaks in America, and it is said that when on the table it is very difficult to distinguish from beef. One of the best eating parts is the heart, which weighs a matter of one and a half tons. The tongue will go up to 3,000 lbs., but it is much tougher than ox tongue, and is not looked on as such a delicacy. Whale flesh has a great advantage over that of sheep, cattle, or pigs in that it is diseaseless. At all events, it is said to be. Then, again, the meat is in a solid lump of uniform quality and without bone. Whether it can be put on the market cheaply enough, and in sufficient quantities to compete successfully with beef, remains to be proved. There is nothing to indicate that the supply is inexhaustible. If the meat is too cheap there may be a danger of the mammal becoming exterminated in a short period. It will be remembered that it did not take long to exterminate the American bison.

1011.—Acidity of Silage Made from Forage Crops.—NEDIG, R., in *Journal of Agricultural Research*, Vol. XIV, No. 10, pp. 395-409. Bibliography of 16 works. Washington, Sept. 2, 1918.

It has been found (Dox, Neidig) that the quality of maize silage depends chiefly on the nature of the acids which are formed during fermentation. The author attempted to ascertain whether the same acids are developed when other commonly grown crops are used for silage purposes. He shows in a series of tables, the results of the determinations of acetic, propionic, butyric and lactic acids, as well as the total acidity produced amongst different plants or plant mixtures used as silage, which have been employed in these researches.

The survey of foregoing work and the results obtained by the author show that all the specimens of high-class maize silage which were examined contained lactic, acetic and propionic acids. The non-volatile lactic acid usually occurs in excess of the sum total of volatile acetic and propionic acids. Amongst the volatile acids, the acetic is much in excess of the propionic acid. The plants or mixed silage plants under examination which showed an acid fermentation similar to maize silage, and which furnished excellent forage were as follows:—Oats + peas (in any proportion) oat; peas; wheat + peas; clover; clover + wheat straw.

On the other hand, alfalfa and a mixture of alfalfa and wheat straw did not develop an acid fermentation similar to that of maize silage, and did not show any fitness for use as silage.

Butyric acid was always found in spoiled or partly spoiled sample.

In a sample of forage silage composed of alfalfa alone, and collected 9 months after siloing, butyric acid was noticeable, and the alfalfa could not be used as forage.

1013.—New Method of Packing Preserved Vegetables.—ANSEMBERGER, G., in *L'Industrie Francaise de la Conserve*, Year V, No. 28, pp. 121-125. Paris, June, 1919.

The methods generally adopted for preserving vegetables have many disadvantages which have the result that the taste and nutritive value of the manufactured products are diminished. The preliminary operation, known as "blanching" which consists in plunging the vegetables into boiling water for a fairly considerable time, is one of the principal causes of waste. This water is considered as waste when the operation is ended. Analysis has shown that it contains carbohydrates and salts

removed from the vegetables; the value of the latter has therefore deteriorated. When they are later put into metallic boxes, in order to be sterilized, the vegetables are again covered with a certain amount of water; it is in fact necessary that they should be submitted to the direct action of the water vapour under pressure, to guarantee long preservation. At the end of the cooking process, and there is still sufficient water for the washing of the edible portions, by virtue of the laws of osmosis, they give up to the liquid into which they are plunged, part of their soluble constituents, until equal concentration of the two liquids is reached; that which forms a component part of the vegetable cells, and which surrounds them. Now the liquid contained in the open box is usually thrown away by the consumer, who really uses a food of reduced value.

The new methods destined to cope with the disadvantages mentioned are steam "blanching" and the Huch process.

In steam "blanching" water is substituted by steam under pressure, and the vegetables are put in an airtight chamber. With steam the vegetables are not immersed in a large quantity of boiling water, and, besides this, it is a much quicker operation than the old system. If the steam contains some of the alimentary principles of the vegetables, it is in relatively small proportions, and the lowering of the nutritive value is much less than before.

The Huch process reduces to a minimum the loss of the nutritive elements due to osmosis of the vegetables placed in metallic boxes; it consists in the least possible use of the liquid, which could not be completely suppressed; it is necessary to have enough water so that the vegetables, during the heating process, respond to the sterilizing action of steam under suitable pressure and retain afterwards sufficient moisture. But to avoid keeping the vegetables in the liquid until the moment for their use, which is not absolutely necessary, the following device should be used: a box is taken with a double bottom, the upper one perforated like a skimmer and placed at 5 mm. distance from the real bottom. The space enclosed between the two is filled with water and all the upper layer receives the vegetables previously treated with steam. The box is heated in a vertical position, the water vaporizes, and the steam comes in contact with the vegetables; the steam condenses in cooling, and the water as a consequence takes its former place between the two layers; the vegetables are thus no longer bathed in the liquid and on the other hand, the presence of a small quantity of water at the bottom of the box retains the required moisture.

From control experiments, on the appearance, taste and chemical composition of produce preserved by means of the usual process and by the Huch process, the advantages of the latter can be clearly seen.

1015.—Preservation of Eggs by Refrigeration after Preliminary Sterilization.—*Revue Scientifique*, Year LVII, No. 8, p. 242. Paris, April, 1919.

The methods of preserving eggs in use until these last few years, and consisting either in plunging the eggs into lime water or into a solution of an alkaline silicate, or coating them with fats, such as vaseline, lard or paraffin, are very unsatisfactory methods. The eggs thus treated are often of a bad taste, and are not protected from putrefaction, because they have not been sterilized.

The cold storage method itself, although used on a large scale (in America, for example, for over two milliards of eggs each year) is not sufficient to ensure perfect preservation. The cold, in fact, does not kill the ferment-causing germs which have penetrated through the shell before the operation; it only suspends their development, which starts again immediately the temperature rises to 1°C. In this way the waste frequently exceeds 5%.

To preserve the egg fresh and wholesome with all its qualities, Lescards discovered that it is sufficient to combine refrigeration with preliminary sterilization in a closed vessel. The eggs are first tested by holding them to the light to eliminate those which are old or cracked; then they are shut in an autoclave attached to a vacuum pump; this operation has the effect of drawing out the gases contained in the little air space in the egg, and thus dissolved in the albumin. Following this, carbonic gas and nitrogen an antiseptic mixture with which the eggs are thus saturated, is introduced into the autoclave. The eggs, now being sterilized, are carried to cold rooms where the temperature is kept between 0° and 2°C. They can remain preserved thus a very long time; at the end of 10 months, the albumin has still retained its whiteness, the air space has remained very small, and the sterilized egg and a fresh egg differ neither in appearance nor taste. The method is already applied in several factories especially equipped for the purpose in France, Belgium and the United States.

PLANT DISEASES

A Helminthosporium Disease of Wheat and Rye.—STAKMAN, LOUISE J., in *University of Minnesota Agr. Exp. Station Bulletin* 191, p. 23.

For several years a destructive disease of wheat, caused by *Helminthosporium*, has been under observation in Minnesota. In the spring and early summer of 1919, serious attacks of seeding blight occurred in practically all wheat growing regions of the state. Marquis was one of the varieties most seriously infected. The cause of this blight has been shown to be a species of *Helminthosporium* which also attacks practically all plant parts. On older plants it is often found associated with *Septoria* and *Fusarium*. All three may occur on one head or one node. All parts of the plant may be affected by *Helminthosporium*, although there is no evidence that the disease is systemic. Since the foot and root may become seriously and permanently diseased, there is a possibility of new infection from stubble. This fact has an important bearing upon the subject of continuous cropping. A similar disease has been found on rye.

The disease clearly is seed-borne. Seeding blight almost always results from sowing diseased seed, although the causal fungus apparently is less virulent than the wheat scab organism. Many infected seedlings revive. Some are left in a weakened condition and with infection at the base. Secondary infections occur on leaf, culm, and head. The problem is at least partially one of clean seed wheat, but probably also of systems of cropping. While the *Helminthosporium* foot rot resembles somewhat the take-all as it develops in Illinois, there are certain differences and it can not be stated that the two diseases are identical. With our present knowledge it seems unsafe to call the disease as it has developed in Minnesota "take-all" or even to assume that it is identical with the foot rots described from other parts of the country.

The partial or almost complete recovery of many of the severely injured seedlings suggests that the disease need not cause undue apprehension on the part of wheat growers. Apparently the disease develops most abundantly when plants are weakened by unfavourable weather conditions. It is quite probable that losses can be minimized somewhat by good cropping methods. However, the disease certainly is capable of doing appreciable damage, and whatever control means suggest themselves as the result of the work done up to the present time should be applied in order that the disease may be kept in check.

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AGRICULTURAL STATISTICS

WORLD'S PRODUCTION OF WHEAT

Countries.	1920.	1919.	Five years' pre-war average 1909-13.
	Bush.	Bush.	Bush.
NORTH AMERICA—			
Canada.....	263,189,000	193,260,000	197,118,000
United States.....	789,878,000	934,265,000	686,697,000
Mexico.....	10,000,000 (a)	10,000,000	8,000,000
Guatemala.....	312,000	251,000	632,000
Total, North America.....	1,063,379,000	1,137,776,000	892,447,000
SOUTH AMERICA—			
Argentina.....	223,000,000	214,142,000	148,908,000
Chili.....	14,000,000 (a)	12,000,000	14,000,000
Uruguay.....	6,000,000 (a)	5,416,000	6,519,000
Total, South America.....	243,000,000	231,558,000	169,427,000
AUSTRALASIA—			
Australia.....	140,000,000 (b)	44,001,000	90,500,000
New Zealand.....	7,000,000 (a)	4,005,000	7,070,000
Total, Australasia.....	147,000,000	48,006,000	97,570,000
AFRICA—			
Algeria.....	8,929,000	19,166,000	34,998,000
Egypt.....	31,711,000	30,137,000	34,121,000
Tunis.....	3,987,000	5,841,000	6,230,000
South Africa.....	8,650,000	6,630,000	6,520,000
Total, Africa.....	53,277,000	61,774,000	81,869,000
ASIA—			
India.....	376,768,000	280,299,000	359,035,000
Japan.....	29,468,000	30,676,000	24,166,000
Korea.....	7,000,000	7,144,000	5,922,000
Persia.....	13,000,000 (a)	13,000,000	13,600,000
Total, Asia.....	426,236,000	331,119,000	402,723,000
EUROPE—			
Great Britain and Ireland.....	57,000,000 (c)	69,324,000	59,640,000
France.....	230,406,000	182,446,000	317,639,000
Italy.....	141,096,000	169,771,000	183,336,000
Belgium.....	7,949,000	9,895,000	14,894,000
Netherlands.....	6,677,000	6,015,000	4,896,000
Denmark.....	6,000,000 (a)	5,923,000	5,344,000
Norway.....	1,000,000 (a)	1,071,000	306,000
Sweden.....	11,123,000	9,509,000	8,103,000
Switzerland.....	3,586,000	3,524,000	3,314,000
Spain.....	134,457,000	129,251,000	130,447,000
Portugal.....	5,000,000 (d)	6,400,000 (a)	7,440,000
Greece.....	13,288,000	9,693,000	9,400,000 (d)
Bulgaria.....	41,190,000	34,029,000	29,308,000 (d)
Jugo-Slavia.....	48,900,000	50,956,000	
Roumania.....	24,000,000	48,492,000	57,896,000 (d)
Bessarabia.....	17,815,000	16,988,000	18,569,000 (d)
Czecho-Slovakia.....	24,436,000	15,051,000	23,541,000 (e)
Germany.....	78,925,000	79,700,000	113,100,000 (d)
Total Europe (less Jugo-Slavia).....	803,948,000	797,082,000	987,173,000
World's total.....	2,736,840,000	2,607,315,000	2,631,209,000

(a) Estimates based on condition reports.

(b) Broomhall.

(c) Official for England and Wales, and Ireland; estimated for Scotland.

(d) Average 1914-18.

(e) Year 1914.

The figures in the above table are practically all official, and constitute a satisfactory statement of the world's production of wheat in 1920, compared with that of 1919 and the pre-war five-year average. All the

producing countries of any importance, except Russia, are included, and Russia is so much out of the world's trade that it need not be considered.

Taken as a whole, the harvest of 1920 was above the average, and greater than that of last year. The world's total shows an increase of 130,000,000 bushels over last year, and 106,000,000 over the pre-war average.

The five great wheat exporting countries: Canada, United States, India, Argentina and Australia, produced this year 1,793,000,000 bushels, an increase of 130,000,000 over last year, and 310,000,000 above the average.

Europe produced 7,000,000 bushels more than last year, due chiefly to the improved crop in France, but the European total is still 183,000,000 bushels less than the pre-war average.

Summing up, the production of the importing countries shows a considerable improvement over last year, though still under average, while the exporting countries produced excellent crops, more than sufficient to supply all requirements.

THE WORLD'S WHEAT SITUATION

Sir James Wilson, K.C.S.I., in a recent article, deals very fully with the wheat supplies of the world, as shown by the official statistics published by the International Institute of Agriculture. The following are the conclusions he arrives at regarding the world's wheat supply and needs. The figures, which represented quintals in the original article, have been converted to bushels in the Institute Branch.

Excluding Russia and Roumania (which on the pre-war average exported annually 217,000,000 bushels, or nearly one-third of the world's net exports) and India (export from which country was then practically prohibited), the other exporting countries began the cereal year on the 1st of August, 1919, with about 224,000,000 bushels of exportable surplus still in hand, besides which there was the unusually large quantity of 70,000,000 bushels afloat on its way from the exporting to the importing countries. During the cereal year ending with July, 1920, the exporting countries exported 690,000,000 bushels compared with 665,000,000, the pre-war average net export of all exporting countries, including Russia, and ended the year on 31st July, 1920, with only about 100,000,000 bushels of exportable surplus, besides which there were 77,000,000 bushels afloat. Of the importing countries, Britain, France and Italy (which on the pre-war average imported 312,000,000 bushels), imported in 1919-20 no less than 382,000,000 bushels, and other European countries imported (including relief supplies) about 195,000,000 bushels as compared with 231,000,000 before the war. All the importing countries taken together imported 670,000,000 bushels, or about the same quantity as their pre-war average imports, and the most important of them ended the cereal year on 1st August, 1920, with about their normal carry-over. During that year the Argentine and Australia got rid of the greater part of their embarrassing surpluses, which had accumulated mainly owing to

lack of tonnage; indeed, the Argentine over-sold and had to prohibit further export in order to retain enough wheat for home consumption. Towards the end of the cereal year the United States had a practical monopoly of export, and took advantage of the situation to obtain very high prices for large exports.

After 1st August, 1920, Britain reaped a poor crop, only about equal to the pre-war average. The measures taken to reduce the bread subsidy raised the price of the 4 lb. loaf from 9½d. to 1s. 4 d., which must have some effect in reducing consumption; and the import of wheat during the current cereal year ending with July, 1921, seems likely to be about the pre-war average, say 220,000,000 bushels, as compared with 212,000,000 last year. France has reaped a much better harvest than in the previous year, and both Government and people are making strenuous efforts to reduce consumption; she may be content with 18,000,000 bushels of import as compared with 88,000,000 last year. Italy has had a very poor crop, and although the Government have taken measures to reduce consumption, she may have to import about 90,000,000 bushels, compared with 85,000,000 bushels last year. The other European countries have on the whole had better crops than last year, and as the cost of foreign wheat measured in their depreciated paper currencies is still very high, they may content themselves with an import of 202,000,000 bushels, as compared with 195,000,000 last year. Allowing for countries outside Europe 90,000,000 bushels, or the same as last year, the import during the current cereal year of all the importing countries in the world may be roughly estimated at 625,000,000 bushels, as compared with 670,000,000 last year.

Turning to the exporting countries. The United States, though it has had a smaller yield than last year, has (including 30,000,000 bus. of old wheat) an exportable surplus of 195,000,000 bus. Canada has had an exceptionally good crop, and can spare a

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similar quantity. The Argentine and Australia are now reaping good harvests, and can probably spare 130,000,000 and 110,000,000 bus. Bulgaria can spare 11,000,000 bus., and the Government of India are allowing the export of at least 15,000,000 bus. out of India's large surplus from the excellent harvest reaped last May. These make a total of 655,000,000 bus., and as the quantity afloat on 1st August, 1920, exceeded the normal by 40,000,000 bus., it may be estimated that there will be 695,000,000 bus. available to meet the demand of all the importing countries, which I have estimated at 625,000,000 bus. This will leave on 1st August, 1921, 70,000,000 of old wheat (besides the normal carry-over) in the exporting countries, and 36,000,000 bus. afloat—a sufficient, though not excessive, margin on the eve of the ripening of the new harvests in the Northern hemisphere.

It is greatly to the advantage of the importing countries that all five of the principal exporting countries have large surpluses to dispose of and will compete with each other. It is also noticeable that Britain, the chief importer, has already since 1st August, 1920, imported half her requirements for the year, and is at present, including her own harvest, well stocked with wheat, so that she can afford to wait for the new wheat, which will soon become available from the Argentine and Australia.

During the last six months there has been a marked fall in ocean freights, as was to be expected from the rapid increase in the quantity of tonnage available, owing to new launchings and the completion of re-conditioning and repairs. Many new ships are still being launched, and it seems probable that by 1st July, 1921, the world's steamer tonnage will be approximately 60,000,000 tons as compared with 45,000,000 at the outbreak of the war, while the demand for cargo space will still be less than the pre-war average demand. A further fall in

ocean freights therefore seems probable. The fall, which has already taken place, has made it possible for the importing countries to offer higher prices for their wheat to the Argentine and Australia, while reducing the c.i.f. cost of imported wheat, and enabled the British Government to reduce the price charged to millers for foreign wheat, a measure which may soon be expected to have the effect of reducing the price to the consumer of the British 4-lb. loaf.

Owing no doubt to this improvement in the wheat position from the point of view of the importing countries, and to the consequent relaxation of their urgent demand for wheat from North America, there has been in the United States and Canada a very marked fall from the monopoly price they were enabled to charge six months ago, though prices there are still about double what they were before the war. They are still fluctuating somewhat violently, owing to the uncertainties of the future, among which may be reckoned the probable action of the Government of India. India has undoubtedly a large surplus of wheat which she would normally export, but this would lead to a serious rise in the price of wheat in India; and as the coming wheat harvest, to be reaped in May, promises to be poor, the Government may refuse to permit the export of more than the 15,000,000 bushels now being purchased for export. On the other hand, the wheat is there, and it would be very profitable for the holders if export were allowed, and if the winter rains prove favourable, the Government may permit a considerable export before 1st August next. It must also be remembered that in all probability millions of peasants in Russia now hold quantities of wheat they would be glad to sell to the highest bidder, and it is just possible that arrangements may be made to permit of the export of a considerable quantity before next August. If either or both of these events happen, a further fall in the world's price of wheat would probably take place (1).

(1) Latest reports as to conditions in Russia indicate that it is not at all likely there will be any considerable quantity of wheat exported from that country during the present grain year. On December 15 drought still prevailed in India, making additional exports improbable.—Editor's note.

SOWING OF WINTER CEREALS

United Kingdom: Early in December farm work was well forward. Increases in the wheat acreage were reported in the south, east and the midland counties of England, but indications are that there has been a decrease in the northern counties.

France: Sowing was practically completed on December 1. An official report confirms

that the new crop was seeded under very favourable conditions, and gives the acreage as considerably greater than that of last year. The new plant was forward and sturdy.

Spain: Reports state that the new crops were sown under favourable conditions, due to the abundance of rain.

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Italy: Reports state that dry weather hindered autumn seeding in many sections. On December 1st it was indicated that the wheat area seeded was below normal. Later reports show that conditions have improved.

Roumania: It is officially confirmed that only a very small acreage has been planted with winter grain. The indicated total wheat acreage is less than 3,000,000 against 4,400,000 last year.

Germany: Early in December the new crops were reported to have had a bad start,

owing to drouthy weather, but improvement was expected, as the drought had been relieved.

Austria: According to indications, where it had been practicable to do the necessary work the winter crops were in good condition.

North Africa: Early in December the condition of the new crops was reported as favourable.

India: On December 1 drought still prevailed and conditions were unfavourable.

FRENCH AGRICULTURE

Within two years after the armistice France has practically remade the vast area of her agricultural soil which was pitted and scarred beyond usefulness by the ravages of war. Figures received by the French Commission, in New York, show that out of 7,000,000 acres which were rendered unfit for cultivation by the effects of battle from 1914 to 1918, only 280,000 acres will not be in a condition to permit of sowing next spring.

The rest of the agricultural area has been restored, or will be restored, by the end of the current year. The reports to the Commission show that 4,000,000 acres, or more than half of the devastated farm land, are already under cultivation. The harvest has been so good that the French Government has been enabled to cancel contracts for the import of South American wheat into France.

The French Department of Agriculture has compiled the following figures giving the progress of France's efforts to feed herself:

	1920.	1919.
	Bush.	Bush.
Wheat.	230,000,000	182,000,000
Rye.	33,000,000	29,000,000
Barley.	35,000,000	23,000,000
Oats.	274,000,000	162,000,000

Considering that rye and barley are used for breadmaking in France, it is reckoned that the crop situation practically insures complete success in feeding the nation with home-grown cereals. Last year it was necessary to import 89,000,000 bushels of

wheat and flour. The improvement means a national saving in money and an agricultural restoration which brings a measure of prosperity to a large proportion of the population, which had previously been deprived of the means of livelihood.

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LIVE STOCK STATISTICS

PRUSSIA.

Classification.	Sept. 1 1920.	June 1 1920.	Sept. 1 1919.	Increase (+) or decrease (-) compared with September 1919.	
				in number.	per cent.
Horses (1).....	2,507,503	2,494,498	2,429,783	+ 77,720	+ 3.2
Cattle.....	9,272,567	9,311,799	8,731,960	+ 540,607	+ 6.2
Sheep.....	4,372,584	4,652,265	3,574,960	+ 597,624	+15.8
Pigs.....	9,756,694	7,921,776	7,344,355	+ 2,412,339	+32.8
Goats.....	2,955,710	3,032,275	2,811,466	+ 144,244	+ 5.1

(1) Not including army horses.

BELGIUM.

Classification	1920	1919	Increase (+) or decrease (-)	
			in number	per cent
Horses (including mules and asses).....	198,154	173,954	+ 24,200	+13.9
Cattle.....	1,292,271	1,151,826	+ 140,445	+12.2
Sheep.....	126,202	112,112	+ 14,090	+12.6
Goats.....	32,660	37,483	- 4,823	-12.9
Pigs.....	545,774	328,155	+ 217,619	+66.3
Poultry.....	3,839,853	2,349,439	+1,490,414	+63.4

DENMARK

Classification	July 15 1920	July 15 1919	Increase(+)or decrease (-)	
			in number	per cent
Horses.....	563,467	558,471	+ 4,996	+ 0.9
Cattle.....	2,286,408	2,188,142	+ 98,266	+ 4.5
Sheep.....	504,241	509,466	- 5,225	- 1.0
Goats.....	44,500	44,537	- 37	- 0.1
Pigs.....	1,007,861	715,909	+ 291,952	+40.8
Poultry.....	13,997,015	12,134,521	+1,862,494	+15.3

IRELAND

Classification	June 1 1920	June 1 1919	Increase(+)or decrease (-)	
			in number	per cent
Horses.....	631,654	624,501	+ 7,153	+1.1
Mules.....	27,077	25,582	+ 1,495	+5.8
Asses.....	226,367	222,469	+ 3,898	+1.8
Cattle.....	5,019,837	5,029,450	- 9,613	-0.2
Sheep.....	3,588,892	3,513,345	+ 75,547	+2.2
Pigs.....	980,078	977,963	+ 2,115	+0.2
Goats.....	247,187	233,287	+ 13,900	+6.0

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NEW ZEALAND

Classification	January 31, 1920	January 31, 1919	Increase (+) or decrease (-)	
			in number	per cent
Horses...	344,248	363,188	- 18,940	- 5.2
Cattle...	3,059,445	3,035,478	+ 23,967	+ 0.8
Sheep...	23,914,506	25,828,554	-1,914,048	- 7.4
Pigs...	259,647	235,347	+ 24,300	+10.3

UNITED STATES FINAL CROP REPORT

The Department of Agriculture makes of the United States for the past three the following report of the principle crops years :

	1920.	1919.	1918.
Winter wheat, bus ..	580,513,000	729,503,000	558,449,000
Spring wheat, " ..	209,365,000	204,762,000	358,651,000
All wheat, " ..	789,878,000	934,265,000	917,100,000
Corn, " ..	3,232,367,000	2,858,599,000	2,582,814,000
Oats, " ..	1,524,055,000	1,234,754,000	1,538,359,000
Rye, " ..	69,318,000	88,909,000	89,103,000
Barley, " ..	202,024,000	161,345,000	256,375,000
Flaxseed, " ..	10,990,000	7,764,000	14,637,000
Potatoes, " ..	430,458,000	357,542,000	397,676,000
Hay, tons.....	108,233,000	109,152,000	89,833,000

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Directory of the Department of Agriculture

Minister The Honourable S. F. Tolmie.

Deputy Minister J. H. Grisdale, B.Agr., D.A.Sc.

Assistant Deputy Minister and Secretary Lt. Col. A. L. F. Jarvis, I.S.O.

The Dominion Experimental Farms Director, E. S. Archibald, B.A., B.S.A.

Functions.—To administer the Central Experimental Farm at Ottawa, twenty branch farms, eight sub-stations, seventy-two illustration stations, and two tobacco stations. The divisions of work are: Administrative, Chemistry, Horticulture, Cereals, Poultry, Animal Husbandry, Forage Plants, Bee, Tobacco, Botany, Field Husbandry, Flax, Illustration Stations, and Extension and Publicity.

Health of Animals Branch Veterinary Director General,
Frederick Torrance, B.A., D.V.S.

Functions.—To administer enactments for the protection of live stock from contagious diseases, and to inspect meats, meat products and canned foods; to conduct research work.

Live Stock Branch Commissioner, H. S. Arkell, M.A., B.S.A.

Functions.—To develop the live stock industry through the use of superior stock; to improve marketing facilities.

Dairy and Cold Storage Branch Commissioner, J. A. Ruddick.

Functions.—To develop the dairy industry; to inspect public cold storage warehouses; to carry on shipping experiments; to administer Dairy enactments.

Seed Branch Commissioner, George H. Clark, B.S.A.

Functions.—To encourage the production and use of pure seed; to test and inspect seed; to inspect feed manufacturing plants; to supply seed in case of shortage.

Entomological Branch Dominion Entomologist,
Arthur Gibson, F.E.S., F.E.S.A.

Functions.—To investigate injurious insects and methods of control; to enforce the Destructive Insect and Pest Act.

Fruit Branch Commissioner, C. W. Baxter.

Functions.—To develop the fruit industry; to enforce the Inspection and Sales Act as it relates to fruit, fruit packages and potatoes; to adjust transportation difficulties.

International Institute of Agriculture Commissioner, T. K. Doherty, LL.B.

Functions.—To represent Canada at the International Institute of Agriculture at Rome; to publish world agricultural information and statistics; to maintain the departmental library.

Agricultural Instruction Act Branch Commissioner (Acting),
J. H. Grisdale, B.Agr., D.A.Sc.

Functions.—To administer the Agricultural Instruction Act, and to report upon the work carried on by the provinces under its provisions.

Publications Branch Director of Publicity, J. B. Spencer, F.S.A.

Functions.—To publish "The Agricultural Gazette;" to distribute departmental publications; to prepare and issue other publicity material.

